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FACT SHEET

**KENTUCKY POLLUTANT DISCHARGE ELIMINATION SYSTEM
PERMIT TO DISCHARGE TREATED WASTEWATER
INTO WATERS OF THE COMMONWEALTH**

KPDES No.: KY0095877
AI No.: 711

Permit Writer: Sara Beard

Date: January 28, 2009

1. SYNOPSIS OF APPLICATION

a. Name and Address of Applicant

North American Stainless
6870 Highway 42 East
Ghent, Kentucky 41045

b. Facility Location

North American Stainless
6870 Highway 42 East
Ghent, Carroll County, Kentucky

c. Description of Applicant's Operation

North American Stainless operates a stainless steel manufacturing facility that produces semi-finished stainless flat-rolled and long products. Scrap steels and home scrap are melted and refined in electric furnaces and then cast into slabs and billets. The slabs are hot rolled into flat products and the billets are hot rolled into long products. Various finishing activities include annealing, acid pickling, cold rolling, and polishing. Standard Industrial Classification (SIC) Codes include 3312, 3315, and 3316.

d. Production Capacity of Facility

An aggregate production capacity for the facility is not available. Each process has an individual production rate which may or may not include rework. The facility is also undergoing expansion with the addition of new processes. Therefore, the production rates for these various units shall be presented in Fact Sheet Attachment A.

e. Description of Existing Pollution Abatement Facilities

Outfall 001 - The main plant discharge of 2,450 gpm combines untreated and treated wastewaters for discharge through a multi-port diffuser. Untreated wastewaters include: Blowdown from AOD/EAF cooling tower, Melt Shop water treatment plant, Z-Mill cooling tower, and Compressor cooling tower, and Storm water runoff various plant locations.

1. SYNOPSIS OF APPLICATION - continued

e. Description of Existing Pollution Abatement Facilities - continued

- Outfall 001 - Treated wastewaters include: Process wastewaters and cooling tower blowdown from the Continuous Casting, Hot Strip Mill, and Long Products Hot Rolling, and process wastewaters from the Long Products Surface Finishing, and Cold Mill Finishing.

Treatment provided to the process wastewater and cooling tower blowdown from the Continuous Casting and Hot Strip Mill operations includes a scale pit, media filters, and high rate recycle.

Treatment provided to the process wastewater and cooling tower blowdown from the Long Products Hot Rolling operation includes a scale pit, media filters, and high rate recycle.

Treatment provided to the process wastewater from the Long Products Surface Finishing operations consists of neutralization.

Treatment of Acid and Salt Rinses, Spent Acid, and Spent Salt Descaler wastewaters consist of chrome reduction, 3 stage neutralization, contact clarification, sand filtration, post neutralization, sludge thickening, and belt filtration.

See Fact Sheet Attachment B for further details.

- Outfall 002 - Eliminated April 6, 2006 with the connection of the sanitary wastewaters to the City of Ghent Wastewater Treatment Plant.
- Outfall 003 - This outfall was eliminated as part of the previous permit reissuance. In past permit this outfall addressed the discharge from the wastewater treatment plant serving the Cold Mill operations. During the interim period the facility has undergone a number of expansions which has resulted in the reconfiguration of the outfalls. Therefore the discharge from these operations will be regulated as an aggregate with other wastewaters of Outfall 001.
- Outfall 004 - This outfall was eliminated as part of the previous permit reissuance. In past permits this outfall addressed the discharge from the wastewater treatment plant serving the Hot Strip Mill (Roughing Mill and Steckel Mill) operations. During the interim period the facility has undergone a number of expansions which has resulted in the reconfiguration of the outfalls. Therefore the discharge from these operations will be regulated as an aggregate with other wastewaters of Outfall 001.
- Outfall 005 - This outfall is an instream monitoring point located on McCool's Creek upstream of the storm water runoff from the southern side North American Stainless. The purpose of this outfall is to the establish background conditions of McCool's Creek.

1. **SYNOPSIS OF APPLICATION - continued**

e. Description of Existing Pollution Abatement Facilities - continued

- Outfall 006 - This outfall is an instream monitoring point located on McCool's Creek downstream of the storm water runoff from North American Stainless. The purpose of this outfall is to the impact the storm water runoff that southern side North American Stainless is having on McCool's Creek.
- Outfall 007 - Untreated plant storm water runoff. In the previous permit this outfall included Outfall 008, which is now rerouted to Outfall 001.
- Outfall 008 - This outfall was eliminated as part of the previous permit reissuance. In past permits this outfall addressed the discharge of process wastewaters from the electric arc furnace, argon-oxygen decarburization, and continuous caster and non-contact cooling water. During the interim period the facility has undergone a number of expansions which has resulted in the reconfiguration of the outfalls. Therefore the discharge from these operations will be regulated as an aggregate with other wastewaters of Outfall 001.
- Outfall 009 - The Billet and Slab Casters of the Melt Shop are the only sources of Total Lead and Total Zinc at the facility. Therefore, to insure compliance with the Effluent Guidelines for these operations an internal compliance point to Outfall 001 is being established.

f. Permitting Action

This permitting action involves a Major Modification of a major KPDES permit for a "New Source" integrated stainless steel facility.

2. **RECEIVING WATERS**

a. Receiving Water Name

Outfalls 001 and 007 discharges to the Ohio River at mile point 442.25 (USCOE mile point 539).

Outfalls 005 and 006 are in-stream monitoring locations on McCool's Creek at approximate mile points 3.1 and 1.95 respectively.

Outfall 009 is an internal monitoring point that discharges to Outfall 001.

b. Stream Segment Use Classifications

The Ohio River is classified as Warmwater Aquatic Habitat and Primary/Secondary Contact Recreation.

c. Stream Segment Antidegradation Categorization

The Ohio River is listed in Kentucky's 303(d) list of impaired waters as required by the Clean Water Act due to PCBs and chlordane. A review of the application submitted for the issuance of this permit did not reveal the presence of PCBs or chlordane in any of the discharges.

2. RECEIVING WATERS - continued

d. Stream Low Flow Condition

At the point of discharge, the 7Q10 and the Harmonic Mean for the Ohio River are 10,600 and 45,300 cfs, respectively.

At the city of Louisville intake, at the nearest downstream public water supply, the 7Q10 and the Harmonic Mean for the Ohio River are 10,600 and 45,300 cfs, respectively.

3. REPORTED DISCHARGE AND PROPOSED LIMITS

Description of Discharge - Outfall 001 - Main Plant Discharge (Treated wastewaters include: Process wastewaters and cooling tower blowdown from the Continuous Casting, Hot Strip Mill, and Long Products Hot Rolling, and process wastewaters from the Long Products Surface Finishing, and Cold Mill Finishing. Untreated wastewaters include: Blowdown from AOD/EAF cooling tower, Melt Shop water treatment plant, Z-Mill cooling tower, and Compressor cooling tower, and Storm water runoff various plant locations.)

Effluent Characteristics	Reported Discharge		Proposed Limits		Applicable Water Quality Criteria and/or Effluent Guidelines
	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum	
Flow (MGD)	1.24	3.60	Report	Report	401 KAR 5:065, Section 2(8)
Total Suspended Solids (lbs/day)					
Tier 1 (No AP4)	108	619	617	1503	401 KAR 5:065, Sections 4 and 5
Tier 2 (AP4 @ 75%)			731	1768	401 KAR 5:080, Section 1(2)(c)2
Tier 3 (AP4 @ 100%)			769	1856	
Oil & Grease (lbs/day)					
Tier 1 (No AP4)	14	1896	96	396	401 KAR 5:065, Sections 4 and 5
Tier 2 (AP4 @ 75%)			134	510	401 KAR 5:080, Section 1(2)(c)2
Tier 3 (AP4 @ 100%)			146	548	
Total Chromium (lbs/day)					
Tier 1 (No AP4)	0.97	14.75	6.1	15.2	401 KAR 5:065, Sections 4 and 5
Tier 2 (AP4 @ 75%)			7.7	19	401 KAR 5:080, Section 1(2)(c)2
Tier 3 (AP4 @ 100%)			8.2	20.3	
Total Nickel (lbs/day)					
Tier 1 (No AP4)	1.52	80.74	6.4	16.7	401 KAR 5:065, Sections 4 and 5
Tier 2 (AP4 @ 75%)			7.5	20.1	401 KAR 5:080, Section 1(2)(c)2
Tier 3 (AP4 @ 100%)			7.9	21.3	
Tier 1 (No AP4)	- Limits are for current operations without Acid Pickling Line 4 and Acid Roaster.				
Tier 2 (AP4 @ 75%)	- Limits are for current operations plus the addition of Acid Pickling Line 4 at 75% capacity and Acid Roaster.				
Tier 3 (AP4 @ 100%)	- Limits are for current operations plus the addition of Acid Pickling Line 4 at 100% capacity and Acid Roaster.				

The data contained under the reported discharge columns is from the analysis of the DMR data (Outfall 003) that has been reported during the term of the current permit.

3. REPORTED DISCHARGE AND PROPOSED LIMITS - continued

Description of Discharge - Outfall 001 - Main Plant Discharge (Treated wastewaters include: Process wastewaters and cooling tower blowdown from the Continuous Casting, Hot Strip Mill, and Long Products Hot Rolling, and process wastewaters from the Long Products Surface Finishing, and Cold Mill Finishing. Untreated wastewaters include: Blowdown from AOD/EAF cooling tower, Melt Shop water treatment plant, Z-Mill cooling tower, and Compressor cooling tower, and Storm water runoff various plant locations.)

Effluent Characteristics	Reported Discharge		Proposed Limits		Applicable Water Quality Criteria and/or Effluent Guidelines
	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum	
Naphthalene (lbs/day)	BDL	BDL	N/A	0.044	401 KAR 5:065, Sections 4 and 5
Tetrachloroethylene (lbs/day)	BDL	BDL	N/A	0.066	401 KAR 5:065, Sections 4 and 5
pH (standard units)	3.10	9.70	6.0 (min)	9.0 (max)	401 KAR 10:031, Section 4 401 KAR 5:065, Sections 4 and 5
Temperature (°F)	86.4	93.0	95	100	401 KAR 10:031, Section 4(1) 401 KAR 5:080, Section 1(2)(c)
Ammonia (as mg/l N)	37.29	108	Report	Report	401 KAR 5:065, Section 2(8)
Hardness (as mg/l CaCO ₃)	2983	7270	Report	Report	401 KAR 5:065, Section 2(8)
Priority Pollutants (mg/l)	0.75	4.45	Report	Report	401 KAR 5:065, Section 2(8)
Specific Conductance (µmho/cm)	N/R	N/R	Report	Report	401 KAR 5:065, Section 2(8)
Total Recoverable Chromium (mg/l)	N/R	N/R	Report	Report	401 KAR 5:065, Section 2(8)
Hexavalent Chromium (mg/l)	N/R	N/R	Report	Report	401 KAR 5:065, Section 2(8)

The data contained under the reported discharge columns is from both the renewal application and the analysis of the DMR data that has been reported during the term of the current permit.

The term Priority Pollutants means those pollutants listed in Fact Sheet Attachment C.

The abbreviation BDL means Below Detection Limit.

The abbreviation N/A means Not Applicable.

The abbreviation N/R means Not Reported.

3. REPORTED DISCHARGE AND PROPOSED LIMITS - continued

Description of Discharge - Outfall 001 - Main Plant Discharge (Treated wastewaters include: Process wastewaters and cooling tower blowdown from the Continuous Casting, Hot Strip Mill, and Long Products Hot Rolling, and process wastewaters from the Long Products Surface Finishing, and Cold Mill Finishing. Untreated wastewaters include: Blowdown from AOD/EAF cooling tower, Melt Shop water treatment plant, Z-Mill cooling tower, and Compressor cooling tower, and Storm water runoff various plant locations.)

Effluent Characteristics	Reported Discharge		Proposed Limits		Applicable Water Quality Criteria and/or Effluent Guidelines
	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum	
Total Recoverable Lead (mg/l)	N/R	N/R	Report	Report	401 KAR 5:065, Section 2(8)
Total Recoverable Nickel (mg/l)	N/R	N/R	Report	Report	401 KAR 5:065, Section 2(8)
Total Recoverable Zinc (mg/l)	N/R	N/R	Report	Report	401 KAR 5:065, Section 2(8)
Acute Toxicity (TU _a)					
Flow ≤2.9 MGD	25.56	66.7	N/A	<20.00	401 KAR 10:029, Section 4
2.9 MGD < Flow ≤3.76 MGD			N/A	<18.03	401 KAR 10:029, Section 4
3.76 MGD < Flow ≤4.5 MGD			N/A	<15.33	401 KAR 10:029, Section 4
Flow ≤2.9 MGD	- When flow of Outfall 001 is 2.9 MGD or less then a toxicity limit of 20 TU _a shall apply.				
2.9 MGD < Flow ≤3.76 MGD	- When the flow of is greater than 2.9 MGD but less than or equal to 3.76 MGD then a toxicity limit of 18.03 TU _a shall apply.				
3.76 MGD < Flow ≤4.5 MGD	- When the flow of is greater than 3.76 MGD but less than or equal to 4.5 MGD then a toxicity limit of 15.33 TU _a shall apply.				

The data contained under the reported discharge columns is from the analysis of the DMR data that has been reported during the term of the current permit.

The abbreviation N/A means Not Applicable.
 The abbreviation N/R means Not Reported.

4. METHODOLOGY USED IN DETERMINING LIMITATIONS

a. Serial Number

Outfall 001 - Main Plant Discharge (Treated wastewaters include: Process wastewaters and cooling tower blowdown from the Continuous Casting, Hot Strip Mill, and Long Products Hot Rolling, and process wastewaters from the Long Products Surface Finishing, and Cold Mill Finishing. Untreated wastewaters include: Blowdown from AOD/EAF cooling tower, Melt Shop water treatment plant, Z-Mill cooling tower, and Compressor cooling tower, and Storm water runoff various plant locations.)

b. Effluent Characteristics

Flow	Total Suspended Solids	Oil & Grease
Total Chromium	Total Nickel	Hexavalent Chromium
Temperature	Total Recoverable Chromium	Total Recoverable Lead
pH	Total Recoverable Nickel	Total Recoverable Zinc
Acute Toxicity	Specific Conductance	Priority Pollutants
Hardness	Ammonia	Tetrachloroethylene
Naphthalene		

c. Pertinent Factors

North American Stainless requested a mixing zone for their heated effluent. After review of the diffuser information submitted by the permittee, the Division of Water has determined that a mixing zone for temperature will be granted.

The facility is a "New Source" subject to the requirements of Subparts F, G, H, I, and J of 40 CFR Part 420 - Iron and Steel Point Source Category. Specifically, the "New Source Performance Standards" (NSPS) for the: Continuous Casting Subcategory (40 CFR 420.64), Hot Forming Subcategory (40 CFR 420.74, Salt Bath Descaling Subcategory (40 CFR 420.84), Acid Pickling (40 CFR 420.94) Subcategory, and Cold Forming Subcategory (40 CFR 420.104).

During the term of the previous permit the facility has undergone and is continuing to undergo a number of expansions. The latest such expansion is the addition of a 4th Acid Pickling Line (AP4) and Acid Roaster (acid regeneration). Due to this latest expansion the requirements for this outfall are being applied on a tiered approach to allow for the construction and ramping up of the new units. The limits for Tier One reflect the current operations at the facility, Tier Two will reflect the addition of AP4 and Roaster at 75% capacity, and Tier Three will reflect the addition of AP4 and Roaster at 100% capacity. Sections 3A and 4A of this fact sheet represent Tier One requirements.

A new multi-port diffuser has been installed at the facility.

A summarization of the effluent guidelines, water quality standards, assumptions, and calculations can be found in Fact Sheet Attachment D - Limits Development, Fact Sheet Attachments E, F, and G - CORMIX Diffuser Model Prediction Files, Fact Sheet Attachments H, I, and J - Steady State Toxics Wasteload Allocation Model (SSTWAM2004), and Fact Sheet Attachment K - CORMIX Diffuser Model Prediction File for Thermal Discharge.

4A. METHODOLOGY USED IN DETERMINING LIMITATIONS - continued

d. Monitoring Requirements

Flow shall be monitored continuously by a recorder.

Ammonia, Hexavalent Chromium, Total Chromium, Total Nickel, Total Recoverable Chromium, Total Recoverable Lead, Total Recoverable Nickel, Total Recoverable Zinc, and Total Suspended Solids shall be monitored once per week by 24-hour composite sample.

Hardness, Oil & Grease, pH, Specific Conductance, and Temperature shall be monitored twice per week by grab sample.

Acute Toxicity shall be monitored monthly by two (2) grab samples collected a minimum of eight (8) hours apart.

Priority Pollutants shall be monitored annually by grab sample. The results of the analyses shall be totaled and reported as a single concentration on the DMR. The individual results for each of the priority pollutants shall be recorded and summarized on a spreadsheet and shall be submitted with the next KPDES permit renewal application. The term Priority Pollutants means those pollutants listed in Fact Sheet Attachment C.

Naphthalene and Tetrachloroethylene shall be annually by grab sample.

e. Justification of Limits

The Kentucky Administrative Regulations (KARs) cited below have been duly promulgated pursuant to the requirements of Chapter 224 of the Kentucky Revised Statutes (KRSs).

Temperature

The limits for this parameter are consistent with the requirements of 401 KAR 10:031, Section 4 and 401 KAR 5:080, Section 1(2)(c). These limits are representative of the Division of Water's Best Professional Judgment (BPJ) determination of BPT and BAT requirements for the control of thermal impacts from cooling water discharges. The basis of this determination was a review of historic DMR data and the study of the effects of the multi-port diffuser on the thermal discharge to the Ohio River.

Ammonia, Flow, Hardness, Hexavalent Chromium, Priority Pollutants, Specific Conductance, Total Recoverable Chromium, Total Recoverable Lead, Total Recoverable Nickel, and Total Recoverable Zinc.

The monitoring requirements for these parameters are consistent with the requirements of 401 KAR 5:065, Section 2(8)(a).

Acute Toxicity

The requirements for this parameter are consistent with the requirements of 401 KAR 5:029, Section 4 and 401 KAR 10:031, Sections 2 and 4.

4. METHODOLOGY USED IN DETERMINING LIMITATIONS - continued

e. Justification of Limits

Naphthalene and Tetrachloroethylene

The limits for these parameters are consistent with the requirements of 401 KAR 5:065, Sections 4 and 5 and. These limits are representative of the "New Source Performance Standards" (NSPS) requirements for a new source integrated stainless steel mill. More specifically, 40 CFR Part 420 - Iron and Steel Manufacturing Point Source Category, Subpart J - Cold Forming Subcategory (40 CFR 420.104(a)(2) Cold rolling mills - Recirculation, multiple stands).

Oil & Grease, Total Chromium, Total Nickel, and Total Suspended Solids

The limits for these parameters are consistent with the requirements of 401 KAR 5:065, Sections 4 and 5 and. These limits are representative of the "New Source Performance Standards" (NSPS) requirements for a new source integrated stainless steel mill. More specifically, 40 CFR Part 420 - Iron and Steel Manufacturing Point Source Category, Subpart F - Continuous Casting Subcategory (40 CFR 420.64), Subpart G - Hot Forming Subcategory (40 CFR 420.74(a)(1) Primary Mills, carbon and specialty - without scarfing, 40 CFR 420.74(b)(2) Section Mills, specialty, and 40 CFR 420.74(c)(1) Flat Mills, Hot strip and sheet mills, carbon and specialty), Subpart H - Salt Bath Descaling Subcategory (40 CFR 420.84(a)(4) Salt bath descaling, oxidizing - continuous), Subpart I - Acid Pickling Subcategory (40 CFR 420.94(c)(1) Combination acid pickling (spent acid solutions and rinse water) - Rod, wire, and coil, 40 CFR 420.94(c)(3) Combination acid pickling (spent acid solutions and rinse water) - Strip, sheet, and plate - continuous, and 40 CFR 420.94(c)(6) Combination acid pickling (spent acid solutions and rinse water) - Fume scrubbers), and Subpart J - Cold Forming Subcategory (40 CFR 420.104(a)(2) Cold rolling mills - Recirculation, multiple stands). These limits are also consistent with the Division of Water's "Best Professional Judgment" (BPJ) determination of the "Best Practicable Control Technology Currently Available" (BPT) and the "Best Available Technology Economically Achievable" (BAT) requirements for the Grinding and Polishing Operations, and the Roaster.

pH

The limits for these parameters are consistent with the requirements of 401 KAR 10:031, Section 4 (Kentucky Water Quality Standards), and 401 KAR 5:065, Sections 4 and 5. These limits are representative of the "New Source Performance Standards" (NSPS) requirements for a new source integrated stainless steel mill. More specifically 40 CFR Part 420 - Iron and Steel Manufacturing Point Source Category, Subpart F - Continuous Casting Subcategory (40 CFR 420.64), Subpart G - Hot Forming Subcategory (40 CFR 420.74(a)(1) Primary Mills, carbon and specialty - without scarfing, 40 CFR 420.74(b)(2) Section Mills, specialty, and 40 CFR 420.74(c)(1) Flat Mills, Hot strip and sheet mills, carbon and specialty), Subpart H - Salt Bath Descaling Subcategory (40 CFR 420.84(a)(4) Salt bath descaling, oxidizing - continuous), Subpart I - Acid Pickling Subcategory (40 CFR 420.94(c)(1) Combination acid pickling (spent acid solutions and rinse water) - Rod, wire, and coil, 40 CFR 420.94(c)(3) Combination acid pickling (spent acid solutions and rinse water) - Strip, sheet, and plate - continuous, and 40 CFR 420.94(c)(6) Combination acid pickling (spent acid solutions and rinse water) - Fume scrubbers), and Subpart J - Cold Forming Subcategory (40 CFR 420.104(a)(2) Cold rolling mills - Recirculation, multiple stands).

PERMIT No.: KY0095877

AI No.: 711

Fact Sheet Page 11

5. REPORTED DISCHARGE AND PROPOSED LIMITS

Description of Discharge - Outfall 002 - Sanitary Wastewater (Internal Outfall)

Effluent Characteristics	Reported Discharge		Proposed Limits		Applicable Water Quality Criteria and/or Effluent Guidelines
	Monthly	Daily	Monthly	Daily	
	Average	Maximum	Average	Maximum	

No effluent limitations or monitoring requirements are being proposed. Outfall 002 has been eliminated.

6 **METHODOLOGY USED IN DETERMINING LIMITATIONS**

a. Serial Number

Outfall 002 - Sanitary Wastewater (Internal Monitoring Point)

b. Effluent Characteristics

None

c. Pertinent Factors

In the previous permit this outfall was an internal monitoring point to determine compliance with secondary treatment standards for the sanitary wastewater prior to commingling with other wastewaters of Outfall 001.

Sanitary wastewaters were connected to the City of Ghent's wastewater collection and treatment system April 6, 2006.

d. Monitoring Requirements

None

e. Justification of Limits

With the connection of the sanitary wastewaters to the City of Ghent's wastewater collection and treatment system this outfall is no longer required and therefore is being eliminated by this permit action.

PERMIT No.: KY0095877

AI No.: 711

Fact Sheet Page 13

7. REPORTED DISCHARGE AND PROPOSED LIMITS

Description of Discharge - Outfall 003 - Cold Mill Operations (Internal Outfall)

Effluent Characteristics	Reported Discharge		Proposed Limits		Applicable Water Quality Criteria and/or Effluent Guidelines
	Monthly	Daily	Monthly	Daily	
	Average	Maximum	Average	Maximum	

No effluent limitations or monitoring requirements are being proposed. This outfall has been eliminated.

8. METHODOLOGY USED IN DETERMINING LIMITATIONS

a. Serial Number

Outfall 003 - Cold Mill Operations (Internal Outfall)

b. Effluent Characteristics

None

c. Pertinent Factors

In the previous permit this outfall addressed the discharge of treated wastewaters from the Cold Mill Operations as an internal compliance point prior to discharging to Outfall 001.

The facility has undergone a number expansions and reconfigurations since the last reissuance of the permit. The effluents from a number of wastewater treatment plants have been combined for discharge through a multi-port diffuser, Outfall 001. Since these wastewaters have similar characteristics and a common discharge point the compliance point has been moved to Outfall 001.

d. Monitoring Requirements

None

e. Justification of Limits

This outfall has been eliminated with the expansions and reconfigurations of the facility. The wastestreams previously addressed by this outfall shall now be addressed by Outfall 001.

PERMIT No.: KY0095877

AI No.: 711

Fact Sheet Page 15

9. REPORTED DISCHARGE AND PROPOSED LIMITS

Description of Discharge - Outfall 004 - Hot Strip Mille (Roughing Mill, and Steckel Mill) Operations (Internal Outfall)

Effluent Characteristics	Reported Discharge		Proposed Limits		Applicable Water Quality Criteria and/or Effluent Guidelines
	Monthly	Daily	Monthly	Daily	
	Average	Maximum	Average	Maximum	

No effluent limitations or monitoring requirements are being proposed. This outfall has been eliminated.

10. METHODOLOGY USED IN DETERMINING LIMITATIONS

a. Serial Number

Outfall 004 - Hot Strip Mill (Roughing Mill, and Steckel Mill) Operations

b. Effluent Characteristics

None

c. Pertinent Factors

In the previous permit this outfall addressed the discharge of treated wastewaters from the Roughing Mill, and Steckel Mill Operations as an internal compliance point prior to discharging to Outfall 001.

The facility has undergone a number expansions and reconfigurations since the last reissuance of the permit. The effluents from a number of wastewater treatment plants have been combined for discharge through a multi-port diffuser, Outfall 001. Since these wastewaters have similar characteristics and a common discharge point the compliance point has been moved to Outfall 001.

d. Monitoring Requirements

None

e. Justification of Limits

This outfall has been eliminated with the expansions and reconfigurations of the facility. The wastestreams previously addressed by this outfall shall now be addressed by Outfall 001.

11. REPORTED DISCHARGE AND PROPOSED LIMITS

Description of Discharge - Outfall 005 - McCool's Creek - Upstream (Instream Monitoring Point)

Effluent Characteristics	Reported Discharge		Proposed Limits		Applicable Water Quality Criteria and/or Effluent Guidelines
	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum	
Flow (MGD)	7.15	33.25	Report	Report	401 KAR 5:065, Section 2(8)
Total Suspended Solids (mg/l)	11.39	106	Report	Report	401 KAR 5:065, Section 2(8)
Oil & Grease (mg/l)	0.41	5.90	Report	Report	401 KAR 5:065, Section 2(8)
Hardness (as mg/l CaCO ₃)	278	410	Report	Report	401 KAR 5:065, Section 2(8)
Total Recoverable Metals (mg/l)	2.67	24.84	Report	Report	401 KAR 5:065, Section 2(8)
Priority Pollutants (mg/l)	0.056	0.122	Removing from permit		401 KAR 5:080, Section 1(2)(c)2
pH (standard units)	7.02 (min)	13.5 (max)	Report	Report	401 KAR 5:065, Section 2(8)

The term Total Recoverable Metals includes the following metals: Antimony, Arsenic, Beryllium, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Silver, Thallium, and Zinc.

The term Priority Pollutants means those pollutants listed in Fact Sheet Attachment C.

The data contained under the reported discharge columns is from the analysis of the DMR data that has been reported during the term of the current permit.

12. METHODOLOGY USED IN DETERMINING LIMITATIONS

a. Serial Number

Outfall 005 - McCool's Creek - Upstream (Instream Monitoring Point)

b. Effluent Characteristics

Flow	Total Suspended Solids	Oil & Grease
pH	Total Recoverable Metals	Priority Pollutants
Hardness		

c. Pertinent Factors

This monitoring point is an instream point located on McCool's Creek upstream of any influence of the facility. Its purpose is to collect background water quality data on McCool's Creek upstream of any influence from the facility. This data will be compared with that of Outfall 006 the downstream instream monitoring location to determine if the storm water from the facility is contributing or adding to the pollution load of McCool's Creek.

d. Monitoring Requirements

Flow shall be monitored instantaneously once per quarter.

Oil & Grease, pH, Total Recoverable Metals, and Total Suspended Solids shall be monitored once per quarter by grab sample.

e. Justification of Limits

The Kentucky Administrative Regulations (KARs) cited below have been duly promulgated pursuant to the requirements of Chapter 224 of the Kentucky Revised Statutes (KRSs).

Flow, Hardness, Oil & Grease, pH, Total Recoverable Metals, and Total Suspended Solids

The monitoring requirements for these parameters are consistent with the requirements of 401 KAR 5:065, Section 2(8)(a).

Priority Pollutants

The removal of these parameters from the permit is consistent with the 401 KAR 5:080, Section 1(2)(c)2. A review of the DMR data for the previous permit indicated that reasonable potential did not exist for these parameters to be limited or monitored in the permit. Therefore, it is the "Best Professional Judgment" (BPJ) of the Division of Water that these parameters be removed from the permit.

13. REPORTED DISCHARGE AND PROPOSED LIMITS

Description of Discharge - Outfall 006 - McCool's Creek - Downstream (Instream Monitoring Point)

Effluent Characteristics	Reported Discharge		Proposed Limits		Applicable Water Quality Criteria and/or Effluent Guidelines
	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum	
Flow (MGD)	7.86	35.68	Report	Report	401 KAR 5:065, Section 2(8)
Total Suspended Solids (mg/l)	8.78	73	Report	Report	401 KAR 5:065, Section 2(8)
Oil & Grease (mg/l)	0.74	24.6	Report	Report	401 KAR 5:065, Section 2(8)
Hardness (as mg/l CaCO ₃)	271	500	Report	Report	401 KAR 5:065, Section 2(8)
Total Recoverable Metals (mg/l)	2.54	22.27	Report	Report	401 KAR 5:065, Section 2(8)
Priority Pollutants (mg/l)	0.035	0.140	Removing from permit		401 KAR 5:080, Section 1(2)(c)2
pH (standard units)	7.30 (min)	13.70 (max)	Report	Report	401 KAR 5:065, Section 2(8)

The term Total Recoverable Metals includes the following metals: Antimony, Arsenic, Beryllium, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Silver, Thallium, and Zinc.

The term Priority Pollutants means those pollutants listed in Fact Sheet Attachment C.

The data contained under the reported discharge columns is from the analysis of the DMR data that has been reported during the term of the current permit.

14. METHODOLOGY USED IN DETERMINING LIMITATIONS

a. Serial Number

Outfall 006 - McCool's Creek - Downstream (Instream Monitoring Point)

b. Effluent Characteristics

Flow	Total Suspended Solids	Oil & Grease
pH	Total Recoverable Metals	Priority Pollutants
Hardness		

c. Pertinent Factors

This monitoring point is an instream point located on McCool's Creek downstream of the facility. Its purpose is to collect water quality data on McCool's Creek downstream of influences from the facility. This data will be compared with that of Outfall 005 the upstream instream monitoring location to determine if the storm water from the facility is contributing or adding to the pollution load of McCool's Creek.

d. Monitoring Requirements

Flow shall be monitored instantaneously once per quarter.

Oil & Grease, pH, Total Recoverable Metals, and Total Suspended Solids shall be monitored once per quarter by grab sample.

e. Justification of Limits

The Kentucky Administrative Regulations (KARs) cited below have been duly promulgated pursuant to the requirements of Chapter 224 of the Kentucky Revised Statutes (KRSs).

Flow, Hardness, Oil & Grease, pH, Total Recoverable Metals, and Total Suspended Solids

The monitoring requirements for these parameters are consistent with the requirements of 401 KAR 5:065, Section 2(8)(a).

Priority Pollutants

The removal of these parameters from the permit is consistent with the 401 KAR 5:080, Section 1(2)(c)2. A review of the DMR data for the previous permit indicated that reasonable potential did not exist for these parameters to be limited or monitored in the permit. Therefore, it is the "Best Professional Judgment" (BPJ) of the Division of Water that these parameters be removed from the permit.

15. REPORTED DISCHARGE AND PROPOSED LIMITS

Description of Discharge - Outfall 007 - Groundwater and Plant Storm Water Runoff

Effluent Characteristics	Reported Discharge		Proposed Limits		Applicable Water Quality Criteria and/or Effluent Guidelines
	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum	
Flow (MGD)	0.5	1.85	Report	Report	401 KAR 5:065, Section 2(8)
Total Suspended Solids (mg/l)	N/R	N/R	Report	Report	401 KAR 5:065, Section 2(8)
Oil & Grease (lbs/day)	1.24	7.90	Report	Report	401 KAR 5:065, Section 2(8)
Hardness (as mg/l CaCO ₃)	306	2860	Report	Report	401 KAR 5:065, Section 2(8)
Total Recoverable Metals (mg/l)	0.4	3.0	Report	Report	401 KAR 5:065, Section 2(8)
Acute Toxicity (TU _a)	5.51	44.1	Removing from permit		401 KAR 5:080, Section 1(2)(c)2
pH (standard units)	7.5	8.2	Report	Report	401 KAR 5:065, Section 2(8)

The term Total Recoverable Metals includes the following metals: Antimony, Arsenic, Beryllium, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Silver, Thallium, and Zinc.

The data contained under the reported discharge columns is from both the renewal application and the analysis of the DMR data that has been reported during the term of the current permit.

16. METHODOLOGY USED IN DETERMINING LIMITATIONS - continued

a. Serial Number

Outfall 007 - Groundwater and Plant Storm Water Runoff

b. Effluent Characteristics

Flow	Total Suspended Solids	Oil & Grease
pH	Total Recoverable Metals	Acute Toxicity
Hardness		

c. Pertinent Factors

In the previous permit this outfall included Outfall 008 (process wastewaters from the electric arc furnace, argon-oxygen decarburization, and continuous caster) and non-contact cooling water. As a result of a number expansions and reconfigurations of the facility these wastewaters have now been relocated to Outfall 001.

d. Monitoring Requirements

Flow shall be monitored instantaneously once per quarter.

Hardness, Oil & Grease, pH, Total Recoverable Metals, and Total Suspended Solids shall be monitored once per quarter by grab sample.

e. Justification of Limits

The Kentucky Administrative Regulations (KARs) cited below have been duly promulgated pursuant to the requirements of Chapter 224 of the Kentucky Revised Statutes (KRSs).

Flow, Oil & Grease, pH, Total Recoverable Metals, and Total Suspended Solids

The monitoring requirements for these parameters are consistent with the requirements of 401 KAR 5:065, Section 2(8)(a).

Priority Pollutants

The removal of these parameters from the permit is consistent with the 401 KAR 5:080, Section 1(2)(c)2. A review of the DMR data for the previous permit indicated that reasonable potential did not exist for these parameters to be limited or monitored in the permit. Therefore, it is the "Best Professional Judgment" (BPJ) of the Division of Water that these parameters be removed from the permit.

PERMIT No.: KY0095877

AI No.: 711

Fact Sheet Page 23

17. REPORTED DISCHARGE AND PROPOSED LIMITS

Description of Discharge - Outfall 008 - Process wastewaters from the electric arc furnace, argon-oxygen decarburization, and continuous caster and non-contact cooling water.

Effluent Characteristics	Reported Discharge		Proposed Limits		Applicable Water Quality Criteria and/or Effluent Guidelines
	Monthly	Daily	Monthly	Daily	
	Average	Maximum	Average	Maximum	

No effluent limitations or monitoring requirements are being proposed. This outfall has been eliminated.

18. METHODOLOGY USED IN DETERMINING LIMITATIONS - continued

a. Serial Number

Outfall 008 - Process wastewaters from the electric arc furnace, argon-oxygen decarburization, and continuous caster and non-contact cooling water.

b. Effluent Characteristics

None

c. Pertinent Factors

In the previous permit this outfall addressed the discharge of process wastewaters from the electric arc furnace, argon-oxygen decarburization, and continuous caster and non-contact cooling water and was an internal monitoring point to Outfall 007.

The facility has undergone a number of expansions and reconfigurations since the last reissuance of the permit. The effluents from a number of wastewater treatment plants have been combined for discharge through a multi-port diffuser, Outfall 001. Since these wastewaters have similar characteristics and a common discharge point the compliance point has been moved to Outfall 001.

d. Monitoring Requirements

None

e. Justification of Limits

This outfall has been eliminated with the expansions and reconfigurations of the facility. The wastestreams previously addressed by this outfall shall now be addressed by Outfall 001.

19. REPORTED DISCHARGE AND PROPOSED LIMITS

Description of Discharge - Outfall 009 - Billet and Slab Casters (Internal Outfall)

Effluent Characteristics	Reported Discharge		Proposed Limits		Applicable Water Quality Criteria and/or Effluent Guidelines
	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum	
Flow (MGD)	N/R	N/R	Report	Report	401 KAR 5:065, Section 2(8)
Total Lead (lbs/day)	0.019	0.300	0.25	0.76	401 KAR 5:065, Sections 4 and 5
Total Zinc (lbs/day)	0.094	0.613	0.38	1.14	401 KAR 5:065, Sections 4 and 5

The data contained under the reported discharge columns is from the analysis of the DMR data for Outfall 008 that has been reported during the term of the current permit.

The abbreviation N/R means Not Reported.

20. METHODOLOGY USED IN DETERMINING LIMITATIONS

a. Serial Number

Outfall 009 - Billet and Slab Casters (Internal Outfall)

b. Effluent Characteristics

Flow	Total Lead	Total Zinc
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c. Pertinent Factors

In the previous permit this outfall addressed the discharge of treated wastewaters from the Melt Shop Operations as an internal compliance point prior to discharging to Outfall 007.

The facility has undergone a number of expansions and reconfigurations since the last reissuance of the permit. The effluents from a number of wastewater treatment plants have been combined for discharge through a multi-port diffuser, Outfall 001. Since these wastewaters have similar characteristics and a common discharge point the compliance point has been moved to Outfall 001.

The facility is a "New Source" subject to the requirements of Subpart F of 40 CFR Part 420 - Iron and Steel Point Source Category. Specifically, the "New Source Performance Standards" (NSPS) for the Continuous Casting Subcategory (40 CFR 420.64).

A summarization of the effluent guidelines, water quality standards, assumptions, and calculations can be found in Fact Sheet Attachment D - Limits Development.

d. Monitoring Requirements

Flow shall be monitored continuously by a recorder.

Total Lead and Total Zinc shall be monitored twice per week by 24-hour composite sample.

e. Justification of Limits

The Kentucky Administrative Regulations (KARs) cited below have been duly promulgated pursuant to the requirements of Chapter 224 of the Kentucky Revised Statutes (KRSs).

Internal Monitoring Point

Section 3(8) of 401 KAR 5:065 authorizes the establishment of internal monitoring points to ensure compliance with applicable treatment requirements, which when commingling with other wastestreams will prevent measuring compliance. In this case, the Melt Shop Operations are the only wastestreams which are regulated for Total Lead and Total Zinc. Therefore, to insure compliance with the Effluent Guideline Requirements for these two parameters an internal monitoring is required.

Flow

The monitoring requirements for this parameter are consistent with the requirements of 401 KAR 5:065, Section 2(8)(a).

20. METHODOLOGY USED IN DETERMINING LIMITATIONS - continued

e. Justification of Limits - continued

Total Lead and Total Zinc

The limits for these parameters are consistent with the requirements of 401 KAR 5:065, Sections 4 and 5 and. These limits are representative of the "New Source Performance Standards" (NSPS) requirements for a new source integrated stainless steel mill. More specifically 40 CFR Part 420 - Iron and Steel Manufacturing Point Source Category, Subpart F - Continuous Casting Subcategory (40 CFR 420.64).

21. ANTIDEGRADATION

The conditions of 401 KAR 10:029, Section 1 have been satisfied by this permit action. Since this permit action involves modification of an existing permit, and does not propose an expanded discharge, a review under 401 KAR 10:030 Section 1 is not applicable.

22. PROPOSED COMPLIANCE SCHEDULE FOR ATTAINING EFFLUENT LIMITATIONS

Permittee shall comply with the effluent limitations by the effective date of the permit.

23. PROPOSED SPECIAL CONDITIONS WHICH WILL HAVE A SIGNIFICANT IMPACT ON THE DISCHARGE

Best Management Practices (BMP) Plan

Pursuant to 401 KAR 5:065, Section 2(10), a BMP requirement shall be included: to control or abate the discharge of pollutants from ancillary areas containing toxic or hazardous substances or those substances which could result in an environmental emergency; where numeric effluent limitations are infeasible; or to carry out the purposes and intent of KRS 224. The facility has several areas where support activities occur which have a potential of the discharge of such substances through storm water runoff or spillage. Some of these areas will drain to present wastewater treatment plants, others will not.

Cooling Water Additives, FIFRA, and Mollusk Control

The discharge of any product registered under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) in cooling water which ultimately may be released to the waters of the Commonwealth is prohibited, except Herbicides, unless specifically identified and authorized by the KPDES permit. In the event the permittee needs to use a biocide or chemical not previously reported for mollusk control or other purpose, the permittee shall submit sufficient information, a minimum of thirty (30) days prior to the commencement of use of said biocides or chemicals, to the Division of Water for review and establishment of appropriate control parameters. Such information requirements shall include:

1. Name and general composition of biocide or chemical,
2. Any and all aquatic organism toxicity data,
3. Quantities to be used,
4. Frequencies of use,
5. Proposed discharge concentrations, and
6. EPA registration number, if applicable.

23. PROPOSED SPECIAL CONDITIONS WHICH WILL HAVE A SIGNIFICANT IMPACT ON THE DISCHARGE
- continued

Outfall Signage

As a member of ORSANCO (Ohio River Valley Sanitation Commission) the Commonwealth of Kentucky through the Division of Water implements a requirement that the permittee post a permanent marker at each discharge point to the Ohio River. It is the Best Professional Judgment of the Division of Water, 401 KAR 5:080, Section 1(2)(c)2, that all permittees post a marker at all discharge locations and/or monitoring points. The ORSANCO requirements for the marker specify it to be at least 2 feet by 2 feet in size and a minimum of 3 feet above ground level with the Permittee Name and KPDES permit and outfall numbers in 2 inch letters. For internal monitoring points the marker shall be of sufficient size to include the outfall number in 2 inch letters and is to be posted as near as possible to the actual sampling location.

MIXING ZONE

North American Stainless has requested a mixing zone of one third (1/3) of the width of the Ohio River in the vicinity of the proposed discharge. Pursuant to the requirements of 401 KAR 10:029, Section 4(6) an assigned mixing zone cannot exceed 1/3 of the width of the receiving water body in any spatial direction. At the proposed point of discharge the width of the Ohio River is 1,837 feet therefore an assigned mixing zone for this discharge can not exceed 612 feet in any spatial direction. In accordance with the requirements of 401 KAR 10:029, Section 4 (1) the mixing zone shall have the following dimensions:

Linear Distance from Point of Discharge:	0.21 feet in any direction
Maximum Surface Area Involved:	0.032 square feet
Volume of Receiving Water	10,600 cfs (1,034 MGD)

24. PERMIT DURATION

This permit modification shall expire on October 31, 2011 (five (5) years from date of initial permit issuance). This facility is in the Salt/Licking Basin Management Unit as per the Kentucky Watershed Management Framework.

25. PERMIT INFORMATION

The application, draft permit fact sheet, public notice, comments received, and additional information is available by writing the Division of Water at 200 Fair Oaks Lane, Frankfort, Kentucky 40601.

26. REFERENCES AND CITED DOCUMENTS

All material and documents referenced or cited in this fact sheet are, a part of the permit information as described above and are readily available at the Division of Water Central Office. Information regarding these materials may be obtained from the person listed below.

27. CONTACT

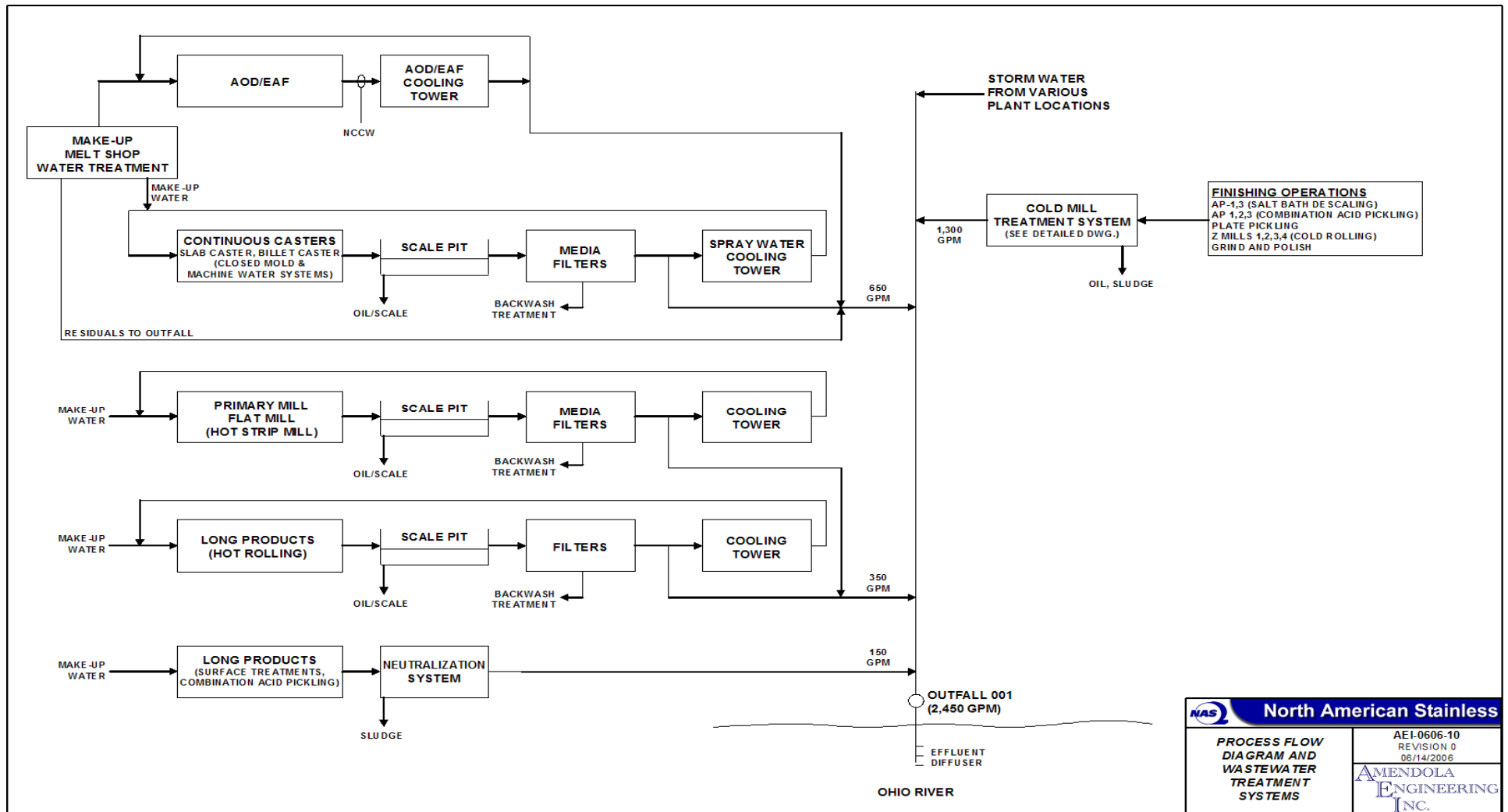
For further information contact the individual identified on the Public Notice or the Permit Writer - Sara Beard at (502) 564-3410, extension 49250 or e-mail Sara.Beard@ky.gov.

28. PUBLIC NOTICE INFORMATION

Please refer to the attached Public Notice for details regarding the procedures for a final permit decision, deadline for comments, and other information required by 401 KAR 5:075, Section 4(2)(e).

TABLE A-1 PRODUCTION RATES			
Operation	(tons/day)		
	Tier 1	Tier 2	Tier 3
Melt Shop			
Slab Caster	3,434	3,434	3,434
Billet Caster	603	603	603
Hot Strip Mill			
Primary Mill	3,794	3,794	3,794
Flat Mill	3,794	3,794	3,794
Cold Mill (Flat Stainless Steel Finishing)			
Salt BD (AP-1 and 3)	1,982	1,982	1,982
AP 1,2, & 3 Strip, Sheet & Plate	3,904	3,904	3,904
Plate Pickling	315	315	315
Z Mills 1,2,3, & 4	5,224	5,224	5,224
Acid Pickle Line 4			
Combination Acid Strip, Sheet, & Plate	0	2,260.5	3014
Long Products			
Hot Forming Section Mill	603	603	603
Coil Lines (Rod, wire, & coil)	154	154	154
Angle Lines (Rod, wire, & coil)	55	55	55
Sulfuric AP (Rod, wire, & coil)	154	154	154

PROCESS FLOW DIAGRAM AND WASTEWATER TREATMENT



COLD MILL WASTEWATER TREATMENT SYSTEM FLOW DIAGRAM

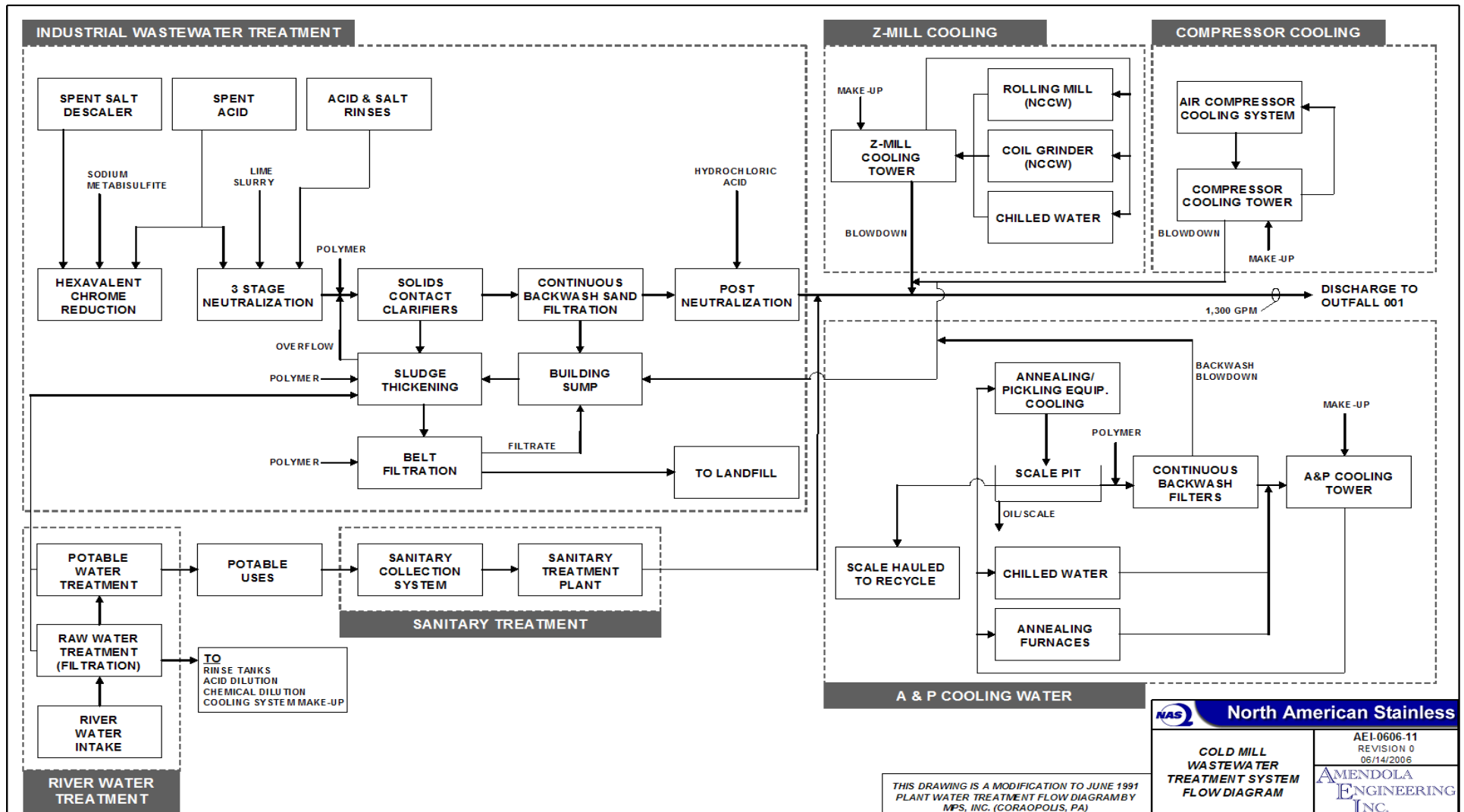


TABLE C-1 PRIORITY POLLUTANTS

001 Acenaphthene	044 Methylene chloride (dichloromethane)	088 Vinyl chloride (chloroethylene)
002 Acrolein	045 Methyl chloride (dichloromethane)	089 Aldrin
003 Acrylonitrile	046 Methyl bromide (bromomethane)	090 Dieldrin
004 Benzene	047 Bromoform (tribromomethane)	091 Chlordane (technical mixture and metabolites)
005 Benzidine	048 Dichlorobromomethane	092 4,4-DDT
006 Carbon tetrachloride (tetrachloromethane)	051 Chlorodibromomethane	093 4,4-DDE (p,p-DDX)
007 Chlorobenzene	052 Hexachlorobutadiene	094 4,4-DDD (p,p-TDE)
008 1,2,4-trichlorobenzene	053 Hexachloromyclopentadiene	095 Alpha-endosulfan
009 Hexachlorobenzene	054 Isophorone	096 Beta-endosulfan
010 1,2-dichloroethane	055 Naphthalene	097 Endosulfan sulfate
011 1,1,1-trichloroethane	056 Nitrobenzene	098 Endrin
012 Hexachloroethane	057 2-nitrophenol	099 Endrin aldehyde
013 1,1-dichloroethane	058 4-nitrophenol	100 Heptachlor
014 1,1,2-trichloroethane	059 2,4-dinitrophenol	101 Heptachlor epoxide (BHC-hexachlorocyclohexane)
015 1,1,2,2-tetrachloroethane	060 4,6-dinitro-o-cresol	102 Alpha-BHC
016 Chloroethane	061 N-nitrosodimethylamine	103 Beta-BHC
018 Bis(2-chloroethyl) ether	062 N-nitrosodiphenylamine	104 Gamma-BHC (lindane)
019 2-chloroethyl vinyl ether (mixed)	063 N-nitrosodi-n-propylamin	105 Delta-BHC (PCB-polychlorinated biphenyls)
020 2-chloronaphthalene	064 Pentachlorophenol	106 PCB-1242 (Arochlor 1242)
021 2,4, 6-trichlorophenol	065 Phenol	107 PCB-1254 (Arochlor 1254)
022 Parachlorometa cresol	066 Bis(2-ethylhexyl) phthalate	108 PCB-1221 (Arochlor 1221)
023 Chloroform (trichloromethane)	067 Butyl benzyl phthalate	109 PCB-1232 (Arochlor 1232)
024 2-chlorophenol	068 Di-N-Butyl Phthalate	110 PCB-1248 (Arochlor 1248)
025 1,2-dichlorobenzene	069 Di-n-octyl phthalate	111 PCB-1260 (Arochlor 1260)
026 1,3-dichlorobenzene	070 Diethyl Phthalate	112 PCB-1016 (Arochlor 1016)
027 1,4-dichlorobenzene	071 Dimethyl phthalate	113 Toxaphene
028 3,3-dichlorobenzidine	072 1,2-benzanthracene (benzo(a)anthracene)	114 Antimony
029 1,1-dichloroethylene	073 Benzo(a)pyrene (3,4-benzo-pyrene)	115 Arsenic
030 1,2-trans-dichloroethylene	074 3,4-Benzofluoranthene (benzo(b)fluoranthene)	116 Asbestos
031 2,4-dichlorophenol	075 11,12-benzofluoranthene (benzo(b)fluoranthene)	117 Beryllium
032 1,2-dichloropropane	076 Chrysene	118 Cadmium
033 1,2-dichloropropylene (1,3-dichloropropene)	077 Acenaphthylene	119 Chromium
034 2,4-dimethylphenol	078 Anthracene	120 Copper
035 2,4-dinitrotoluene	079 1,12-benzoperylene (benzo(ghi) perylene)	121 Cyanide, Total
036 2,6-dinitrotoluene	080 Fluorene	122 Lead
037 1,2-diphenylhydrazine	081 Phenanthrene	123 Mercury
038 Ethylbenzene	082 1,2,5,6-dibenzanthracene (dibenzo(,h) anthracene)	124 Nickel
039 Fluoranthene	083 Indeno (,1,2,3-cd) pyrene (2,3-o-pheynylene pyrene)	125 Selenium
040 4-chlorophenyl phenyl ether	084 Pyrene	126 Silver
041 4-bromophenyl phenyl ether	085 Tetrachloroethylene	127 Thallium
042 Bis(2-chloroisopropyl) ether	086 Toluene	126 Silver
043 Bis(2-chloroethoxy) methane	087 Trichloroethylene	128 Zinc
		129 2,3,7,8-tetrachloro-dibenzo-p-dioxin (TCDD)

REGULATORY REQUIREMENTS - EFFLUENT GUIDELINES

The facility is a "New Source" subject to the requirements of Subparts F, G, H, I, and J of 40 CFR Part 420 - Iron and Steel Point Source Category. Specifically, the "New Source Performance Standards" (NSPS) for the: Continuous Casting Subcategory (40 CFR 420.64), Hot Forming Subcategory (40 CFR 420.74, Salt Bath Descaling Subcategory (40 CFR 420.84), Acid Pickling (40 CFR 420.94) Subcategory, and Cold Forming Subcategory (40 CFR 420.104).

PART 420 - IRON AND STEEL MANUFACTURING POINT SOURCE CATEGORY

Subsection 420.02 - General Definitions

- (a) The term **TSS** (or total suspended solids, or total suspended residue) means the value obtained by the method specified in 40 CFR 136.3.
- (b) The term **oil and grease** (or O&G) means the value obtained by the method specified in 40 CFR 136.3.
- (c) The term **ammonia-N** (or ammonia-nitrogen) means the value obtained by manual distillation (at pH 9.5) followed by the Nesslerization method specified in 40 CFR 136.3.
- (d) The term **cyanide** means total cyanide and is determined by the method specified in 40 CFR 136.3.
- (e) The term **phenols 4AAP** (or phenolic compounds) means the value obtained by the method specified in 40 CFR 136.3.
- (f) The term **TRC** (or total residual chlorine) means the value obtained by the iodometric titration with an amperometric endpoint method specified in 40 CFR 136.3.
- (g) The term **chromium** means total chromium and is determined by the method specified in 40 CFR 136.3.
- (h) The term **hexavalent chromium** (or chromium VI) means the value obtained by the method specified in 40 CFR 136.3.
- (i) The term **copper** means total copper and is determined by the method specified in 40 CFR 136.3.
- (j) The term **lead** means total lead and is determined by the method specified in 40 CFR 136.3.
- (k) The term **nickel** means total nickel and is determined by the method specified in 40 CFR 136.3.
- (l) The term **zinc** means total zinc and is determined by the method specified in 40 CFR 136.3.
- (m) The term **benzene** (or priority pollutant No. 4) means the value obtained by the standard method Number 602 specified in 44 FR 69464, 69570 (December 3, 1979).

REGULATORY REQUIREMENTS - EFFLUENT GUIDELINES

PART 420 - IRON AND STEEL MANUFACTURING POINT SOURCE CATEGORY

Subsection 420.02 - General Definitions

- (n) The term **benzo(a)pyrene** (or priority pollutant No. 73) means the value obtained by the standard method Number 610 specified in 44 FR 69464, 69570 (December 3, 1979).
- (o) The term **naphthalene** (or priority pollutant No. 55) means the value obtained by the standard method Number 610 specified in 44 FR 69464, 69571 (December 3, 1979).
- (p) The term **tetrachloroethylene** (or priority pollutant No. 85) means the value obtained by the standard method Number 610 specified in 44 FR 69464, 69571 (December 3, 1979).
- (q) The term **pH** means the value obtained by the standard method specified in 40 CFR 136.3.
- (r) The term **non-process wastewaters** means utility wastewaters (for example, water treatment residuals, boiler blowdown, and air pollution control wastewaters from heat recovery equipment); treated or untreated wastewaters from groundwater remediation systems; dewatering water for building foundations; and other wastewater streams not associated with a production process.
- (s) The term **nitrification** means oxidation of ammonium salts to nitrites (via Nitrosomas bacteria) and the further oxidation of nitrite to nitrate via Nitrobacter bacteria. Nitrification can be accomplished in either:
 - (1) A single or two-stage activated sludge wastewater treatment system; or
 - (2) Wetlands specifically developed with a marsh/pond configuration and maintained for the express purpose of removing ammonia-N.

Indicators of nitrification capability are:

- (1) Biological monitoring for ammonia oxidizing bacteria (AOB) and nitrite oxidizing bacteria (NOB) to determine if the nitrification is occurring; and
- (2) Analysis of the nitrogen balance to determine if nitrifying bacteria reduce the amount of ammonia and increase the amount of nitrite and nitrate.

REGULATORY REQUIREMENTS - EFFLUENT GUIDELINES

PART 420 - IRON AND STEEL MANUFACTURING POINT SOURCE CATEGORY

Subsection 420.02 - General Definitions

- (t) The term **storm water from the immediate process area** means storm water that comes into contact with process equipment located outdoors, storm water collected in process area and bulk storage tank secondary containment structures, and storm water from wastewater treatment systems located outdoors, provided that it has the potential to become contaminated with process wastewater pollutants for the particular subcategory. Storm water from building roofs, plant roadways, and other storm waters that do not have the potential to become contaminated with process wastewater pollutants are not storm water from the immediate process area.
- (u) The term **2,3,7,8-TCDF** means 2,3,7,8-tetrachlorodibenzofuran.

SUBPART F - Continuous Casting Subcategory

§ 420.60 Applicability; description of the continuous casting subcategory.

The provisions of this subpart are applicable to discharges and to the introduction of pollutants into publicly owned treatment works resulting from the continuous casting of molten steel into intermediate or semi-finished steel products through water cooled molds.

§ 420.64 New source performance standards (NSPS).

The discharge of wastewater pollutants from any new source subject to this subpart shall not exceed the standards set forth below.

TABLE D-1		
Effluent Characteristic	Maximum for Any 1 Day	Average of daily values for 30 consecutive days
	lbs per 1,000 lbs of product	
Total Suspended Solids	0.00730	0.00261
Oil & Grease	0.00313	0.00104
Total Lead	0.0000939	0.0000313
Total Zinc	0.000141	0.0000469
pH	(1)	(1)
Within the range of 6.0 to 9.0		

REGULATORY REQUIREMENTS - EFFLUENT GUIDELINES

PART 420 - IRON AND STEEL MANUFACTURING POINT SOURCE CATEGORY

SUBPART G - Hot Forming Subcategory

§ 420.70 Applicability; description of the hot forming subcategory.

The provisions of this subpart are applicable to discharges and to the introduction of pollutants into publicly owned treatment works resulting from hot forming operations conducted in primary, section, flat, and pipe and tube mills.

§ 420.71 Specialized definitions

- (a) The term **hot forming** means those steel operations in which solidified, heated steel is shaped by rolls.
- (b) The term **primary mill** means those steel hot forming operations that reduce ingots to blooms or slabs by passing the ingots between rotating steel rolls. The first hot forming operation performed on solidified steel after it is removed from the ingot molds is carried out on a "primary mill".
- (c) The term **section mill** means those steel hot forming operations that produce a variety of finished and semi-finished steel products other than the products of those mills specified below in paragraphs (d), (e), (g), and (h) of this section.
- (d) The term **flat mill** means those steel hot forming operations that reduce heated slabs to plates, strip and sheet, or skelp.
- (e) The term **pipe and tube mill** means those steel hot forming operations that produce butt welded or seamless tubular steel products.
- (f) The term **scarfing** means those steel surface conditioning operations in which flames generated by the combustion of oxygen and fuel are used to remove surface metal imperfections from slabs, billets, or blooms.
- (g) The term **plate mill** means those steel hot forming operations that produce flat hot-rolled products which are (1) between 8 and 48 inches wide and over 0.23 inches thick; or (2) greater than 48 inches wide and over 0.18 inches thick.
- (h) The term **hot strip and sheet mill** means those steel hot forming operations that produce flat hot-rolled products other than plates.

REGULATORY REQUIREMENTS - EFFLUENT GUIDELINES

PART 420 - IRON AND STEEL MANUFACTURING POINT SOURCE CATEGORY

SUBPART G - Hot Forming Subcategory

§ 420.71 Specialized definitions

- (i) The term **specialty steel** means those steel products containing alloying elements which are added to enhance the properties of the steel product when individual alloying elements (e.g., aluminum, chromium, cobalt, columbium, molybdenum, nickel, titanium, tungsten, vanadium, zirconium) exceed 3% or the total of all alloying elements exceed 5%.
- (j) The term **carbon steel** means those steel products other than specialty steel products.
- (k) The term **carbon hot forming operation (or "carbon")** means those hot forming operations which produce a majority, on a tonnage basis, of carbon steel products.
- (l) The term **specialty hot forming operation (or "specialty")** applies to all hot forming operations other than "carbon hot forming operations."

§ 420.74 New source performance standards (NSPS).

The discharge of wastewater pollutants from any new source subject to this subpart shall not exceed the standards set forth below.

(a) Primary mills, carbon and specialty-(1) Without scarfing.

TABLE D-2		
Effluent Characteristic	Maximum for Any 1 Day	Average of daily values for 30 consecutive days
	lbs per 1,000 lbs of product	
Total Suspended Solids	0.0150	0.00563
Oil & Grease	0.00373	-----
pH	(1)	(1)
¹ Within the range of 6.0 to 9.0		

REGULATORY REQUIREMENTS - EFFLUENT GUIDELINES

PART 420 - IRON AND STEEL MANUFACTURING POINT SOURCE CATEGORY

SUBPART G - Hot Forming Subcategory

§ 420.74 New source performance standards (NSPS).

The discharge of wastewater pollutants from any new source subject to this subpart shall not exceed the standards set forth below.

(b) Section mills—(2) Specialty.

TABLE D-3		
Effluent Characteristic	Maximum for Any 1 Day	Average of daily values for 30 consecutive days
	lbs per 1,000 lbs of product	
Total Suspended Solids	0.0217	0.00813
Oil & Grease	0.00542	-----
pH	(1)	(1)
¹ Within the range of 6.0 to 9.0		

(c) Flat mills—(1) Hot strip and sheet mills, carbon and specialty

TABLE D-4		
Effluent Characteristic	Maximum for Any 1 Day	Average of daily values for 30 consecutive days
	lbs per 1,000 lbs of product	
Total Suspended Solids	0.0435	0.0163
Oil & Grease	0.0109	-----
pH	(1)	(1)
¹ Within the range of 6.0 to 9.0		

REGULATORY REQUIREMENTS - EFFLUENT GUIDELINES

PART 420 - IRON AND STEEL MANUFACTURING POINT SOURCE CATEGORY

SUBPART H - Salt Bath Descaling Subcategory

§ 420.80 Applicability; description of the salt bath descaling subcategory.

The provisions of this subpart are applicable to discharges and to the introduction of pollutants into publicly owned treatment works resulting from oxidizing and reducing salt bath descaling operations.

§ 420.81 Specialized definitions.

- (a) The term **salt bath descaling, oxidizing** means the removal of scale from semi-finished steel products by the action of molten salt baths other than those containing sodium hydride.
- (b) The term **salt bath descaling, reducing** means the removal of scale from semi-finished steel products by the action of molten salt baths containing sodium hydride.
- (c) The term **batch, sheet and plate** means those descaling operations that remove surface scale from sheet and plate products in batch processes.
- (d) The term **batch, rod and wire** means those descaling operations that remove surface scale from rod and wire products in batch processes.
- (e) The term **batch, pipe and tube** means those descaling operations that remove surface scale from pipe and tube products in batch processes.
- (f) The term **continuous** means those descaling operations that remove surface scale from the sheet or wire products in continuous processes.
- (g) The term **batch** means those descaling operations in which the products are processed in discrete batches.

REGULATORY REQUIREMENTS - EFFLUENT GUIDELINES

PART 420 - IRON AND STEEL MANUFACTURING POINT SOURCE CATEGORY

SUBPART H - Salt Bath Descaling Subcategory

§ 420.84 New source performance standards (NSPS).

The discharge of wastewater pollutants from any new source subject to this subpart shall not exceed the standards set forth below.

(a) Salt bath descaling, oxidizing—(4) Continuous.

TABLE D-5		
Effluent Characteristic	Maximum for Any 1 Day	Average of daily values for 30 consecutive days
	lbs per 1,000	lbs of product
Total Suspended Solids	0.00730	0.00261
Oil & Grease	0.00313	0.00104
Total Lead	0.0000939	0.0000313
Total Zinc	0.000141	0.0000469
pH	(1)	(1)
¹ Within the range of 6.0 to 9.0		

Subpart I - Acid Pickling Subcategory

§ 420.90 Applicability; description of the acid pickling subcategory

The provisions of this subpart are applicable to discharges and to the introduction of pollutants into publicly owned treatment works resulting from sulfuric acid, hydrochloric acid, or combination acid pickling operations.

§ 420.91 Specialized definitions

- (a) The term **sulfuric acid pickling** means those operations in which steel products are immersed in sulfuric acid solutions to chemically remove oxides and scale, and those rinsing operations associated with such immersions.
- (b) The term **hydrochloric acid pickling** means those operations in which steel products are immersed in hydrochloric acid solutions to chemically remove oxides and scale, and those rinsing operations associated with such immersions.

REGULATORY REQUIREMENTS - EFFLUENT GUIDELINES

PART 420 - IRON AND STEEL MANUFACTURING POINT SOURCE CATEGORY

Subpart I - Acid Pickling Subcategory

§ 420.91 Specialized definitions

- (c) The term **combination acid pickling** means those operations in which steel products are immersed in solutions of more than one acid to chemically remove scale and oxides, and those rinsing steps associated with such immersions.
- (d) The term **fume scrubber** means those pollution control devices used to remove and clean fumes originating in pickling operations.
- (e) The term **batch** means those pickling operations which process steel products such as coiled wire, rods, and tubes in discrete batches or bundles.
- (f) The term **continuous** means those pickling operations which process steel products other than in discrete batches or bundles.
- (g) The term **acid recovery** means those sulfuric acid pickling operations that include processes for recovering the unreacted acid from spent pickling acid solutions.
- (h) The term **acid regeneration** means those hydrochloric acid pickling operations that include processes for regenerating acid from spent pickling acid solutions.
- (i) The term **neutralization** means those acid pickling operations that do not include acid recovery or acid regeneration processes.
- (j) The term **spent acid solution** (or spent pickle liquor) means those solutions of steel pickling acids which have been used in the pickling process and are discharged or removed therefrom.
- (k) The term **rod, wire and coil** means those acid pickling operations that pickle rod, wire or coiled rod and wire products.
- (l) The term **bar, billet and bloom** means those acid pickling operations that pickle bar, billet or bloom products.
- (m) The term **strip, sheet and plate** means those acid pickling operations that pickle strip, sheet or plate products.
- (n) The term **pipe, tube and other** means those acid pickling operations that pickle pipes, tubes or any steel product other than those included in paragraphs (k), (l) and (m) of this section.

REGULATORY REQUIREMENTS - EFFLUENT GUIDELINES

PART 420 - IRON AND STEEL MANUFACTURING POINT SOURCE CATEGORY

Subpart I - Acid Pickling Subcategory

§ 420.94 New source performance standards (NSPS).

(c) Combination acid pickling (spent acid solutions and rinse waters)

(1) Rod, wire, and coil

TABLE D-6		
Effluent Characteristic	Maximum for Any 1 Day	Average of daily values for 30 consecutive days
	lbs per 1,000 lbs of product	
Total Suspended Solids	0.0204	0.00876
Oil & Grease ¹	0.00876	0.00292
Total Chromium	0.000292	0.000117
Total Nickel	0.000263	0.0000876
pH	(2)	(2)
¹ The limitations for oil and grease shall be applicable when acid pickling wastewaters are treated with cold rolling wastewaters.		
² Within the range of 6.0 to 9.0		

(3) Strip, sheet and plate—continuous

TABLE D-7		
Effluent Characteristic	Maximum for Any 1 Day	Average of daily values for 30 consecutive days
	lbs per 1,000 lbs of product	
Total Suspended Solids	0.0496	0.0213
Oil & Grease ¹	0.0213	0.00710
Total Chromium	0.000710	0.000284
Total Nickel	0.000638	0.000213
pH	(2)	(2)
¹ The limitations for oil and grease shall be applicable when acid pickling wastewaters are treated with cold rolling wastewaters.		
² Within the range of 6.0 to 9.0		

REGULATORY REQUIREMENTS - EFFLUENT GUIDELINES

PART 420 - IRON AND STEEL MANUFACTURING POINT SOURCE CATEGORY

Subpart I - Acid Pickling Subcategory

§ 420.94 New source performance standards (NSPS).

(c) Combination acid pickling (spent acid solutions and rinse waters)

(6) Fume scrubbers

TABLE D-8		
Effluent Characteristic	Maximum for Any 1 Day	Average of daily values for 30 consecutive days
	Kgs/day	
Total Suspended Solids	5.72	2.45
Oil & Grease ¹	2.45	0.819
Total Chromium	0.0819	0.0327
Total Nickel	0.0735	0.0245
pH	(2)	(2)
¹ The limitations for oil and grease shall be applicable when acid pickling wastewaters are treated with cold rolling wastewaters.		
² Within the range of 6.0 to 9.0		

Subpart J - Cold Forming Subcategory

§ 420.100 Applicability; description of the acid pickling subcategory

- (a) The provisions of this subpart are applicable to discharges and to the introduction of pollutants into publicly owned treatment works from cold rolling and cold working pipe and tube operations in which unheated steel is passed through rolls or otherwise processed to reduce its thickness, to produce a smooth surface, or to develop controlled mechanical properties in the steel.
- (b) The limitations and standards set out below for cold worked pipe and tube operations shall be applicable only where cold worked pipe and tube wastewaters are discharged at steel plant sites. No limitations are applicable or allowable where these wastewaters are hauled off-site for disposal or are otherwise not discharged at steel plant sites. The limitations and standards set out below for cold worked pipe and tube operations shall be applicable only to the blowdown of soluble oil or water solutions used in cold worked pipe and tube forming operations. Limitations for other wastewater sources from these operations must be established on a site-specific basis.

REGULATORY REQUIREMENTS - EFFLUENT GUIDELINES

PART 420 - IRON AND STEEL MANUFACTURING POINT SOURCE CATEGORY

Subpart J - Cold Forming Subcategory

§ 420.101 Specialized definitions

- (a) The term **recirculation** means those cold rolling operations which include recirculation of rolling solutions at all mill stands.
- (b) The term **combination** means those cold rolling operations which include recirculation of rolling solutions at one or more mill stands, and once-through use of rolling solutions at the remaining stand or stands.
- (c) The term **direct application** means those cold rolling operations which include once-through use of rolling solutions at all mill stands.
- (d) The term **single stand** means those recirculation or direct application cold rolling mills which include only one stand of work rolls.
- (e) The term **multiple stands** means those recirculation or direct application cold rolling mills which include more than one stand of work rolls.
- (f) The term **cold worked pipe and tube** means those cold forming operations that process unheated pipe and tube products using either water or oil solutions for cooling and lubrication.

§ 420.104 New source performance standards (NSPS).

(a) Cold rolling mills

REGULATORY REQUIREMENTS - EFFLUENT GUIDELINES

PART 420 - IRON AND STEEL MANUFACTURING POINT SOURCE CATEGORY

Subpart J - Cold Forming Subcategory

(2) Recirculation-multiple stands

TABLE D-9		
Effluent Characteristic	Maximum for Any 1 Day	Average of daily values for 30 consecutive days
	lbs per 1,000	lbs of product
Total Suspended Solids	0.00250	0.00125
Oil & Grease	0.00104	0.000417
Total Chromium ¹	0.0000418	0.0000167
Total Lead	0.0000188	0.0000063
Total Nickel ¹	0.0000376	0.0000125
Total Zinc	0.0000125	0.0000042
Naphthalene	0.0000042	-----
Tetrachloroethylene	0.0000063	-----
pH	(2)	(2)
¹ The limitations for chromium and nickel shall be applicable in lieu of those for lead and zinc when cold rolling wastewaters are treated with descaling or combination acid pickling wastewaters		
² Within the range of 6.0 to 9.0		

REGULATORY REQUIREMENTS - BEST PROFESSIONAL JUDGMENT - 401 KAR 5:080, Section 1(2)(c)2

In accordance with 401 KAR 5:080, Section 1(2)(c) 2 in the absence of promulgated technology based standards the cabinet may develop appropriate technology based standards utilizing its "Best Professional Judgment" (BPJ). In this case the following criteria were not promulgated:

- (1) "Average of daily values for 30 consecutive days" criteria for Oil & Grease from the Hot Forming Operations (Primary and Flat Mills) and Long Products (Hot Forming Section Mill),
- (2) "Maximum for Any 1 Day" and "Average of daily values for 30 consecutive days" for Total Chromium and Total Nickel from the Continuous Casting Operations (Billet and Slab Casters) and Long Products (Hot Forming Section Mill),
- (3) "Maximum for Any 1 Day" and "Average of daily values for 30 consecutive days" for Total Suspended Solids, Oil & Grease, Total Chromium and Total Nickel from the Cold Mill Operations (Grinding and Polishing), and Acid Pickling (Roaster),

REGULATORY REQUIREMENTS - BEST PROFESSIONAL JUDGMENT (BPJ) - 401 KAR 5:080, Section 1(2)(c)2

- (4) "Maximum for Any 1 Day" and "Average of daily values for 30 consecutive days" for Total Suspended Solids, Oil & Grease, Total Chromium and Total Nickel from the Acid Pickling Operations (Roaster).

The Division of Water (DOW) utilized the Final Development Document for Effluent Limitations Guidelines and Standards for the Iron and Steel Manufacturing Point Source Category, May 1982, EPA 440/1-82/024 and the Draft Development Document for Effluent Limitations Guidelines and Standards for the Iron and Steel Manufacturing Point Source Category, December 2000, EPA 821-B-00-011, Appendix F to develop the appropriate requirements.

Table I-5 of the 1982 Final Development Document provides model treatment plant effluent flows and qualities that were used to develop the NSPS requirements for each subcategory. Attachment 12-3 of Appendix F of the 2000 Draft Development document provided concentration based limitations. The following table presents the flows and concentrations utilized to develop the effluent limitations for the aforementioned BPJ determinations.

Operation	Flow Rate	Total Suspended Solids		Oil & Grease		Total Chromium		Total Nickel	
		Maximum	Average	Maximum	Average	Maximum	Average	Maximum	Average
Hot Forming									
Primary Mill	90 GPT ⁽¹⁾	-----	-----	-----	0.00123 ⁽⁴⁾	0.097 ⁽⁵⁾	0.043 ⁽⁵⁾	0.329 ⁽⁵⁾	0.172 ⁽⁵⁾
Flat Mill	260 GPT ⁽¹⁾	-----	-----	-----	0.003597 ⁽⁴⁾	0.097 ⁽⁵⁾	0.043 ⁽⁵⁾	0.329 ⁽⁵⁾	0.172 ⁽⁵⁾
Continuous Casting									
Billet Caster	25 GPT ⁽¹⁾	-----	-----	-----	-----	0.097 ⁽⁵⁾	0.043 ⁽⁵⁾	0.329 ⁽⁵⁾	0.172 ⁽⁵⁾
Slab Caster	25 GPT ⁽¹⁾	-----	-----	-----	-----	0.097 ⁽⁵⁾	0.043 ⁽⁵⁾	0.329 ⁽⁵⁾	0.172 ⁽⁵⁾
Cold Mill									
Grinding & Polishing	0.075 MGD ⁽²⁾	70 ⁽¹⁾	30 ⁽¹⁾	30 ⁽¹⁾	10 ⁽¹⁾	1.0 ⁽¹⁾	0.4 ⁽¹⁾	0.9 ⁽¹⁾	0.3 ⁽¹⁾
Acid Pickling									
Roaster	0.072 MGD ⁽³⁾	70 ⁽¹⁾	30 ⁽¹⁾	30 ⁽¹⁾	10 ⁽¹⁾	1.0 ⁽¹⁾	0.4 ⁽¹⁾	0.9 ⁽¹⁾	0.3 ⁽¹⁾
Long Products									
Hot Forming Section Mill	130 GPT ⁽¹⁾				0.001789 ⁽⁴⁾	0.097 ⁽⁵⁾	0.043 ⁽⁵⁾	0.329 ⁽⁵⁾	0.172 ⁽⁵⁾

GPT means Gallons Per Ton. MGD means Million Gallons Per Day Units for all other values are mg/l

⁽¹⁾Values are from Table I-5 of the 1982 Final Development Document. These flows and concentrations were utilized by EPA in the determining if an effluent guideline requirement would be developed.

⁽²⁾Flow rate is the actual flow rate of this operation.

⁽³⁾Flow rate is the anticipated flow rate of this operation.

⁽⁴⁾Values are one third of the maximum factor for Hot Forming Operations. Neither Table I-5 nor Attachment 12-3 addressed an average value for Oil & Grease. Reviewing the other subcategories of the Iron and Steel Effluent Guidelines it was determined that the average factor was approximately 1/3 of the maximum factor.

⁽⁵⁾Values are from Attachment 12-3 of Appendix F of the 2000 Draft Development Document.

REGULATORY REQUIREMENTS - WATER QUALITY STANDARDS - 401 KAR 5:031, Section 6

TABLE D-11				
Pollutant or Pollutant Characteristic	Acute Criteria	Chronic Criteria	Human Health Fish & Water Consumption	Human Health Fish Only
Total Recoverable Chromium	-----	-----	100	-----
Trivalent Chromium	$e^{(0.8190 (\ln \text{Hard}^*)+3.7256)}$	$e^{(0.8190 (\ln \text{Hard}^*)+0.6848)}$	-----	-----
Hexavalent Chromium	16	11	-----	-----
Total Recoverable Copper	$e^{(0.9422 (\ln \text{Hard}^*)-1.700)}$	$e^{(0.8545 (\ln \text{Hard}^*)-1.702)}$	1,300	-----
Total Recoverable Lead	$e^{(1.273 (\ln \text{Hard}^*)-1.460)}$	$e^{(1.273 (\ln \text{Hard}^*)-4.705)}$	15	-----
Total Recoverable Nickel	$e^{(0.8460 (\ln \text{Hard}^*)+2.255)}$	$e^{(0.8460 (\ln \text{Hard}^*)+0.0584)}$	610	4,600
Total Recoverable Silver	$e^{(1.72 (\ln \text{Hard}^*)-6.59)}$	-----	-----	-----
Total Recoverable Zinc	$e^{(0.8473 (\ln \text{Hard}^*)+0.884)}$	$e^{(0.8473 (\ln \text{Hard}^*)+0.884)}$	7,400	26,000
Free Cyanide	22	5.2	700	220,000
pH (Standard Units)	Within the range of 6.0 to 9.0 at all times		-----	-----
The units for this table are µg/l				

LIMITS CALCULATIONS - EFFLUENT GUIDELINES

The final effluent limitations required by the effluent guidelines are a summation of the component contributions, i.e. the summation of the requirements of Subparts F, G, H, I, and J.

With the exception of the effluent limits for Fume Scrubbers (40 CFR 420.94(c)(6)) the following formulas were used to calculate the contribution from each source.

$$\text{Monthly Average} = [(\text{Production Rate (tons/day)}) \times (\text{Monthly Average Factor (lbs/1000 lbs of product)}) \times (\text{Conversion Factor (2000 lbs/ton)})]$$

$$\text{Daily Maximum} = [(\text{Production Rate (tons/day)}) \times (\text{Daily Maximum Factor (lbs/1000 lbs of product)}) \times (\text{Conversion Factor (2000 lbs/ton)})]$$

For the Fume Scrubber contribution the following formulas were used.

$$\text{Monthly Average} = [(\text{Number of Fume Scrubbers}) \times (\text{Monthly Average Factor (Kg)}) \times (\text{Conversion Factor (2.2046 lbs/Kg)})]$$

$$\text{Daily Maximum} = [(\text{Number of Fume Scrubbers}) \times (\text{Daily Maximum Factor (Kg)}) \times (\text{Conversion Factor (2.2046 lbs/Kg)})]$$

Substituting the production rates for each process (Attachment A - Table A-1) and the appropriate factors, presented in the Regulatory Requirements - Effluent Guidelines section of this Attachment (Tables D-1 through D-9), the contributions from each process are determined. The following tables are a summarization of these calculations.

LIMITS CALCULATIONS - EFFLUENT GUIDELINES

[illegible]

LIMITS CALCULATIONS - EFFLUENT GUIDELINES

TABLE D-14								
Operation	Total Suspended Solids		Oil & Grease		Total Chromium		Total Nickel	
	Maximum	Average	Maximum	Average	Maximum	Average	Maximum	Average
Acid Pickle Line 4								
Tier One (APL4 not in operation)								
Combination Acid Strip, Sheet, & Plate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Combination Acid Pickling Fume Scrubbers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tier Two (APL4 at 75% capacity)								
Combination Acid Strip, Sheet, & Plate	224.25	96	96	32.1	3.23	1.28	2.85	0.98
Combination Acid Pickling Fume Scrubbers	9.46	4.05	4.05	1.36	0.14	0.05	0.12	0.04
Total	233.71	100.05	100.05	33.46	3.37	1.33	2.97	1.02
Tier Three (APL4 at 100% capacity)								
Combination Acid Strip, Sheet, & Plate	299	128	128	42.8	4.3	1.7	3.8	1.3
Combination Acid Pickling Fume Scrubbers	12.61	5.40	5.40	1.81	0.18	0.07	0.16	0.05
Total	311.61	133.4	133.4	44.61	4.48	1.77	3.96	1.35
The units for these effluent limitations are in lbs/day.								
Acid Pickle Line 4 will have one Fume Scrubber.								

LIMITS CALCULATIONS - EFFLUENT GUIDELINES

Operation	Total Lead		Total Zinc		Naphthalene		Tetrachloroethylene	
	Maximum	Average	Maximum	Average	Maximum	Average	Maximum	Average
Acid Pickle Line 4								
Tier One (APL4 not in operation)								
Combination Acid Strip, Sheet, & Plate	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Combination Acid Pickling Fume Scrubbers	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tier Two (APL4 at 75% capacity)								
Combination Acid Strip, Sheet, & Plate	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Combination Acid Pickling Fume Scrubbers	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tier Three (APL4 at 100% capacity)								
Combination Acid Strip, Sheet, & Plate	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Combination Acid Pickling Fume Scrubbers	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
The units for these effluent limitations are in lbs/day.								
The abbreviation N/A indicates that the effluent guidelines did not have a promulgated requirement for that item.								

The following table is a summation of all the effluent guideline based limitations.

TABLE D-16						
Pollutant	Tier One		Tier Two		Tier Three	
	Maximum	Average	Maximum	Average	Maximum	Average
Total Suspended Solids	1,478.73	597.94	1,712.44	698.44	1,790.34	731.34
Oil & Grease	377.59	87.35	478.09	120.81	510.99	131.96
Total Chromium	13.27	5.36	16.64	6.69	17.75	7.13
Total Nickel	12.02	4.00	14.99	5.02	15.98	5.35
Total Lead ⁽¹⁾	0.75	0.25	0.75	0.25	0.75	0.25
Total Zinc ⁽¹⁾	1.14	0.38	1.14	0.38	1.14	0.38
Naphthalene	0.044	N/A	0.044	N/A	0.044	N/A
Tetrachloroethylene	0.066	N/A	0.066	N/A	0.066	N/A
The units for these effluent limitations are in lbs/day.						
⁽¹⁾ The limits for Total Lead and Total Zinc shall be applied at Outfall 009 (an internal monitoring point of Outfall 001)						

LIMITS CALCULATIONS - BEST PROFESSIONAL JUDGMENT (BPJ) - 401 KAR 5:080, Section 1(2)(c)2

The BPJ based contributions from the Hot Forming (Hot Strip Mill - Primary and Flat Mills, and Long Products - Hot Forming Section Mill) and the Continuous Casting (Melt Shop - Slab and Billet Casting) operations for Total Chromium and Total Nickel were calculated using the following formulas.

$$\text{Monthly Average} = \left[\left(\frac{(\text{Flow Rate (gallons per ton)} \times (\text{Production Rate (tons/day)}))}{\text{Conversion Factor (1,000,000 gallons/MGD)}} \right) \times (\text{Conversion Factor (8.345)} \times (\text{Monthly Average Concentration (mg/l)})) \right]$$

$$\text{Daily Maximum} = \left[\left(\frac{(\text{Flow Rate (gallons per ton)} \times (\text{Production Rate (tons/day)}))}{\text{Conversion Factor (1,000,000 gallons/MGD)}} \right) \times (\text{Conversion Factor (8.345)} \times (\text{Daily Maximum Concentration (mg/l)})) \right]$$

Where: The Flow Rates are from Table I-5 of the 1982 Final Development Document for the Iron and Steel Manufacturing Point Source Category. The Monthly Average Concentrations and Daily Maximum Concentrations are from the 2000 Draft Development Document for the Iron and Steel Manufacturing Point Source Category, Appendix F, Attachment 12-3.

Substituting the Flow Rates, Monthly Average, and Daily Maximum Concentrations from Table D-10 and the Production Rates from Table A-1 the contributions from each process are determined. The following table is a summarization of these calculations.

TABLE 17				
Operation	Total Chromium		Total Nickel	
	Maximum	Average	Maximum	Average
Hot Strip Mill				
Primary Mill	0.28	0.12	0.94	0.49
Flat Mill	0.80	0.35	2.71	1.42
Long Products				
Hot Forming Section Mill	0.06	0.03	0.22	0.11
Melt Shop				
Slab Caster	0.07	0.03	0.24	0.12
Billet Caster	0.012	0.005	0.041	0.022
The units for these effluent limitations are in lbs/day.				

LIMITS CALCULATIONS - BEST PROFESSIONAL JUDGMENT (BPJ) - 401 KAR 5:080, Section 1(2)(c)2

The BPJ based contributions from the Hot Forming (Hot Strip Mill - Primary and Flat Mills, and Long Products - Hot Forming Section Mill) operations for Monthly Average Oil & Grease were calculated using the following formula.

$$\text{Monthly Average} = [(\text{Production Rate (tons/day)}) \times (\text{BPJ Monthly Average Factor (lbs/1000 lbs of product)}) \times (\text{Conversion Factor (2000 lbs/ton)})]$$

Where: The BPJ Monthly Average Factor is one third of the "Maximum for any 1 day" factor found in Subpart G (40 CFR 420.74(a)(1), 40 CFR 420.74 (b)(2), and 40 CFR 420.74 (c)(1)).

Substituting the Production Rates from Table A-1 and the BPJ Monthly Average Factors from Table D-10 the contributions from each process are determined. The following tables are a summarization of these calculations.

TABLE 18	
Operation	Oil & Grease Average
Hot Strip Mill	
Primary Mill	9.34
Flat Mill	27.29
Long Products	
Hot Forming Section Mill	2.16
The units for these effluent limitations are in lbs/day.	

The BPJ based contributions from the Cold Mill (Grinding and Polishing) and Acid Pickling (Roaster) operations for Total Suspended Solids, Oil & Grease, Total Chromium, and Total Nickel were calculated using the following formulas.

$$\text{Monthly Average} = [(\text{Flow Rate (MGD)}) \times (\text{Conversion Factor (8.345)}) \times (\text{Monthly Average Concentration (mg/l)})]$$

$$\text{Daily Maximum} = [(\text{Flow Rate (MGD)}) \times (\text{Conversion Factor (8.345)}) \times (\text{Daily Maximum Concentration (mg/l)})]$$

Where: The Flow Rates, Monthly Average Concentrations, and Daily Maximum Concentrations are from Table I-5 of the 1982 Final Development Document for the Iron and Steel Manufacturing Point Source Category.

Substituting the Flow Rates, Monthly Average, and Daily Maximum Concentrations from Table D-10 the contributions from each process are determined. The following table is a summarization of these calculations.

LIMITS CALCULATIONS - BEST PROFESSIONAL JUDGMENT (BPJ) - 401 KAR 5:080, Section 1(2)(c)2

TABLE 19								
Operation	Total Suspended Solids		Oil & Grease		Total Chromium		Total Nickel	
	Maximum	Average	Maximum	Average	Maximum	Average	Maximum	Average
Cold Mill								
Grinding and Polishing	43.8	18.8	18.8	6.3	0.6	0.3	0.6	0.2
Acid Pickling Line 4								
Roaster								
Tier One	0	0	0	0	0	0	0	0
Tier Two	31.55	13.52	13.52	4.51	0.45	0.18	0.41	0.14
Tier Three	42.06	18.03	18.03	6.01	0.6	0.24	0.54	0.18

The units for these effluent limitations are in lbs/day.

LIMITS CALCULATIONS - EFFLUENT GUIDELINES AND BEST PROFESSIONAL JUDGMENT (BPJ) - 401 KAR 5:080, Section 1(2)(c)2

The final effluent limitations are determined by adding the results presented in Tables D-16, D-17, D-18, and D-19. Table D-20 summarizes the final effluent limitations.

TABLE D-20						
Pollutant	Tier One		Tier Two		Tier Three	
	Maximum	Average	Maximum	Average	Maximum	Average
Total Suspended Solids	1502.7	616.7	1767.9	730.6	1856.3	768.5
Oil & Grease	396.4	95.8	510.2	133.8	548.2	146.4
Total Chromium	15.2	6.1	19.0	7.7	20.3	8.2
Total Nickel	16.7	6.4	20.1	7.5	21.3	7.9
Total Lead ⁽¹⁾	0.75	0.25	0.75	0.25	0.75	0.25
Total Zinc ⁽¹⁾	1.14	0.38	1.14	0.38	1.14	0.38
Naphthalene	0.044	N/A	0.044	N/A	0.044	N/A
Tetrachloroethylene	0.066	N/A	0.066	N/A	0.066	N/A

The units for these effluent limitations are in lbs/day.

⁽¹⁾The limits for Total Lead and Total Zinc shall be applied at Outfall 009 (an internal monitoring point of Outfall 001)

LIMITS CALCULATIONS - WATER QUALITY STANDARDS

The calculation of water quality based effluent limitations requires the application of the water quality criteria specified in 401 KAR 5:031, Sections 3, 4 and 6 to the appropriate mixing zones and zones of initial dilution (ZID) consistent with 401 KAR 5:029, Section 4. The aquatic life acute criteria apply at the end-of-the pipe or at the edge of a ZID. The granting of a ZID requires the discharge to be through a submerged multi-port diffuser. The aquatic life chronic criteria and human health fish only consumption criteria apply at the edge of the regulatory mixing zone. The human health fish and water consumption criteria apply at the point of withdrawal of the nearest downstream public water supply. The regulatory mixing zone assigned to this permit is 1/3 of the width of the receiving stream or 0.333. To determine available dilution provided by a ZID, the EPA approved diffuser model CORMIX Giv4.3 was used.

LIMITS CALCULATIONS - WATER QUALITY STANDARDS - CORMIX DIFFUSER MODEL

The model requires the size of the mixing zone and the ZID to be inputs. First to determine the size of the regulatory mixing zone the width of the Ohio River at the point of discharge is determined. From topographical information the Ohio River is approximately 1836 feet (560 meters) wide in the vicinity of the discharge point. Applying of the 1/3 of the width of the stream as a restriction produces a mixing zone of 611 feet (186 meters).

The determination of the size of the allowable ZID is constrained by the requirements of 401 KAR 5:029, Section 4(4)(a), (b), and (c). These restrictions are presented in the following text.

- 4(4)(a): The acute criteria shall be met within ten (10) percent of the distance from the edge of the outfall structure to the edge of the regulatory mixing zone in a spatial direction. In this case the ZID would be restricted to a distance of 61.1 feet (18.6 meters).
- 4(4)(b): The acute criteria shall be met within a distance of fifty (50) times the square root of the cross-sectional area of a discharge port, in a spatial direction. The following formula is used to calculate this distance.

$$\text{distance} = 50 \times \sqrt{\frac{\pi d^2}{4}}$$

The diameter of the ports is 10 inches (0.25 meters), which results in a distance of 443 inches (1.126 meters) or 36.9 feet (11.25 meters).

- 4(4)(c): The acute criteria shall be met in a horizontal direction within a distance of five (5) times the natural water depth that prevails under mixing zone design conditions, and exists before the installation of a discharge outlet. The local water depth is 6.98 feet (2.13 meters) therefore; a distance of 34.9 feet (10.65 meters) is derived.

LIMITS CALCULATIONS - WATER QUALITY STANDARDS - DIFFUSER MODEL

Comparing these three criteria the second case or 4(4)(c) is the most restrictive and is therefore used in the diffuser models.

The applicant has requested graduated Whole Effluent Toxicity (WET) limitations based on three design flows, 2.9 MGD, 3.76 MGD, and 4.5 MGD. This request was based on the installation of a new diffuser and a number of expansions at the facility. Fact Sheet Attachments E, F, and G are the CORMIX Session Reports and Prediction Files for each of these design flows. The Session Report and Prediction File are summarizations of the diffuser and receiving stream characteristics, and the resultant calculations. The following table presents dilutions provided by diffuser at each design flow.

Table D-21			
Design Flow (MGD)	2.9	3.76	4.5
Dilutions	76.6	60.1	51.1

LIMITS CALCULATIONS - WATER QUALITY STANDARDS - SSTWAM2004

The development of water quality based effluent limitations is accomplished using the Division of Water developed EXCEL Workbook known as SSTWAM2004. This workbook is a Steady State Toxics Wasteload Allocation Model which calculates the aquatic life and human health based limitations utilizing the results of the diffuser model, stream characteristics, and the characteristics of the discharge. Fact Sheet Attachments H, I, and J present the inputs and results of these calculations. The following table presents the calculated and proposed WET effluent limitations.

Table D-22				
Design Flow (MGD)	Calculated WET Limitations		Proposed WET limitations	
	Acute Toxicity Units (TU _s)	Percent Effluent	Acute Toxicity Units (TU _s)	Percent Effluent
2.9	22.98	4.35	20.00	5.00
3.76	18.03	5.55	18.03	5.55
4.5	15.33	6.52	15.33	6.52
The application of a 20 TU _a in lieu of the SSTWAM2004 calculated value for the design flow of 2.9 MGD is the result of an agreement between the permittee and the Division of Water.				

The previous permit contain a WET effluent limitation of 16.86 TU_a, the limits proposed in this renewal are less stringent for two of the design flows. These changes in the WET effluent limitation are consistent with the requirements of 401 KAR 5:065, Section 2(12), in that extensive physical and operational change have occurred over the interim term of the permit. In addition the permittee committed within the support documentation of the permit renewal package to investigate further operational changes to reduce toxicity.

LIMITS CALCULATIONS - EFFLUENT GUIDELINE AND WATER QUALITY STANDARDS COMPARISON

The final step in the limits determination is to compare the limitations generated by the effluent guidelines and those generated by the water quality standards. In attempting to compare these two sets of limits none of the parameters are common to both sets. In the ELG the requirements for Chromium, Lead, Nickel, and Zinc are expressed as Totals. In the Kentucky Water Quality Standards Chromium is expressed as Total Recoverable, Hexavalent, and Trivalent, and Lead, Nickel and Zinc are expressed as Total Recoverable. In all cases the Kentucky Water Quality Standards requirements are actually components of the Totals species required by the effluent guidelines. The following tables illustrate the comparison of the two sets of limitations.

Table D-23						
Pollutant or Pollutant Property	Flow Rate	Tier	Kentucky Water Quality Standards (Total Recoverable)		Federal Effluent Guidelines (Totals)	
			Maximum	Average	Maximum	Average
			milligrams per liter		milligrams per liter	
Chromium	2.9 MGD	1	-----	233	0.63	0.25
Hexavalent Chromium	2.9 MGD	1	1.23	1.23	-----	-----
Trivalent Chromium	2.9 MGD	1	226	93	-----	-----
Lead	2.9 MGD	1	13.45	4.1	0.031	0.01
Nickel	2.9 MGD	1	59.72	59.72	0.69	0.26
Zinc	2.9 MGD	1	14.82	14.82	0.047	0.016

Table D-24						
Pollutant or Pollutant Property	Flow Rate	Tier	Kentucky Water Quality Standards (Total Recoverable)		Federal Effluent Guidelines (Totals)	
			Maximum	Average	Maximum	Average
			milligrams per liter		milligrams per liter	
Chromium	3.76 MGD	1	-----	180	0.48	0.19
Hexavalent Chromium	3.76 MGD	1	186	72	-----	-----
Trivalent Chromium	3.76 MGD	1	0.96	0.96	-----	-----
Lead	3.76 MGD	1	11.36	3.19	0.024	0.008
Nickel	3.76 MGD	1	49.11	49.11	0.53	0.20
Zinc	3.76 MGD	1	12.20	12.20	0.036	0.012

LIMITS CALCULATIONS - EFFLUENT GUIDELINE AND WATER QUALITY STANDARDS COMPARISON

Table D-25						
Pollutant or Pollutant Property	Flow Rate	Tier	Kentucky Water Quality Standards (Total Recoverable)		Federal Effluent Guidelines (Totals)	
			Maximum	Average	Maximum	Average
			milligrams per liter		milligrams per liter	
Chromium	4.5 MGD	1	-----	150	0.41	0.16
Hexavalent Chromium	4.5 MGD	1	164	61	-----	-----
Trivalent Chromium	4.5 MGD	1	0.82	0.82	-----	-----
Lead	4.5 MGD	1	10.20	2.68	0.020	0.007
Nickel	4.5 MGD	1	43.31	43.31	0.45	0.17
Zinc	4.5 MGD	1	10.77	10.77	0.030	0.010

Table D-26						
Pollutant or Pollutant Property	Flow Rate	Tier	Kentucky Water Quality Standards (Total Recoverable)		Federal Effluent Guidelines (Totals)	
			Maximum	Average	Maximum	Average
			milligrams per liter		milligrams per liter	
Chromium	2.9 MGD	2	-----	233	0.79	0.32
Hexavalent Chromium	2.9 MGD	2	1.23	1.23	-----	-----
Trivalent Chromium	2.9 MGD	2	226	93	-----	-----
Lead	2.9 MGD	2	13.45	4.1	0.031	0.01
Nickel	2.9 MGD	2	59.72	59.72	0.83	0.31
Zinc	2.9 MGD	2	14.82	14.82	0.047	0.016

Table D-27						
Pollutant or Pollutant Property	Flow Rate	Tier	Kentucky Water Quality Standards (Total Recoverable)		Federal Effluent Guidelines (Totals)	
			Maximum	Average	Maximum	Average
			milligrams per liter		milligrams per liter	
Chromium	3.76 MGD	2	-----	180	0.61	0.19
Hexavalent Chromium	3.76 MGD	2	186	72	-----	-----
Trivalent Chromium	3.76 MGD	2	0.96	0.96	-----	-----
Lead	3.76 MGD	2	11.36	3.19	0.024	0.008
Nickel	3.76 MGD	2	49.11	49.11	0.64	0.24
Zinc	3.76 MGD	2	12.20	12.20	0.036	0.012

LIMITS CALCULATIONS - EFFLUENT GUIDELINE AND WATER QUALITY STANDARDS COMPARISON

Table D-28						
Pollutant or Pollutant Property	Flow Rate	Tier	Kentucky Water Quality Standards (Total Recoverable)		Federal Effluent Guidelines (Totals)	
			Maximum	Average	Maximum	Average
			milligrams per liter		milligrams per liter	
Chromium	4.5 MGD	2	-----	150	0.51	0.21
Hexavalent Chromium	4.5 MGD	2	164	61	-----	-----
Trivalent Chromium	4.5 MGD	2	0.82	0.82	-----	-----
Lead	4.5 MGD	2	10.20	2.68	0.020	0.007
Nickel	4.5 MGD	2	43.31	43.31	0.54	0.21
Zinc	4.5 MGD	2	10.77	10.77	0.030	0.010

Table D-29						
Pollutant or Pollutant Property	Flow Rate	Tier	Kentucky Water Quality Standards (Total Recoverable)		Federal Effluent Guidelines (Totals)	
			Maximum	Average	Maximum	Average
			milligrams per liter		milligrams per liter	
Chromium	2.9 MGD	3	-----	233	0.84	0.34
Hexavalent Chromium	2.9 MGD	3	1.23	1.23	-----	-----
Trivalent Chromium	2.9 MGD	3	226	93	-----	-----
Lead	2.9 MGD	3	13.45	4.1	0.031	0.01
Nickel	2.9 MGD	3	59.72	59.72	0.88	0.33
Zinc	2.9 MGD	3	14.82	14.82	0.047	0.016

Table D-30						
Pollutant or Pollutant Property	Flow Rate	Tier	Kentucky Water Quality Standards (Total Recoverable)		Federal Effluent Guidelines (Totals)	
			Maximum	Average	Maximum	Average
			milligrams per liter		milligrams per liter	
Chromium	3.76 MGD	3	-----	180	0.65	0.26
Hexavalent Chromium	3.76 MGD	3	186	72	-----	-----
Trivalent Chromium	3.76 MGD	3	0.96	0.96	-----	-----
Lead	3.76 MGD	3	11.36	3.19	0.024	0.008
Nickel	3.76 MGD	3	49.11	49.11	0.68	0.25
Zinc	3.76 MGD	3	12.20	12.20	0.036	0.012

LIMITS CALCULATIONS - EFFLUENT GUIDELINE AND WATER QUALITY STANDARDS COMPARISON

Table D-31						
Pollutant or Pollutant Property	Flow Rate	Tier	Kentucky Water Quality Standards (Total Recoverable)		Federal Effluent Guidelines (Totals)	
			Maximum	Average	Maximum	Average
			milligrams per liter		milligrams per liter	
Chromium	4.5 MGD	3	-----	150	0.54	0.22
Hexavalent Chromium	4.5 MGD	3	164	61	-----	-----
Trivalent Chromium	4.5 MGD	3	0.82	0.82	-----	-----
Lead	4.5 MGD	3	10.20	2.68	0.020	0.007
Nickel	4.5 MGD	3	43.31	43.31	0.57	0.21
Zinc	4.5 MGD	3	10.77	10.77	0.030	0.010

A review of Tables D-23 through D-31 indicates that the effluent guideline based Total species are more stringent than water quality based Total Recoverable, Hexavalent and Trivalent species. Additionally, the reasonable potential analyses performed as a function of the SSTWAM2004 runs, Attachments H, I, and J, indicated that water quality based effluent limitations for these parameters were not required. Although SSTWAM2004 indicated that monitoring was also not necessary, the Division of Water is exercising its "Best Professional Judgment" by requiring monitoring for Hexavalent and Total Recoverable Chromium, Total Recoverable Lead, Total Recoverable Nickel, and Total Recoverable Zinc. Neither the permit renewal application nor the DMR data from the previous permit contained a sufficient number of data points for the Division of Water to conduct an analysis, therefore monitoring for these parameters is being imposed.

CORMIX SESSION REPORT: CASE I - 2.9 MGD

XX

CORMIX MIXING ZONE EXPERT SYSTEM

CORMIX-GI Version 4.3GT

HYDRO2:Version-4.3.0.2 June,2005

SITE NAME/LABEL: North American Stainless
DESIGN CASE: Case I - 2.9 MGD
FILE NAME: C:\Program Files\CORMIX-GI 4.3\95877 North American
Stainless 2.9 MGD.prd
Using subsystem CORMIX2: Submerged Multiport Diffuser Discharges
Start of session: 07/14/2006--14:23:06

SUMMARY OF INPUT DATA:

AMBIENT PARAMETERS:

Cross-section = bounded
Width BS = 560 m
Channel regularity ICHREG = 1
Ambient flowrate QA = 300.16 m³/s
Average depth HA = 2.76 m
Depth at discharge HD = 2.13 m
Ambient velocity UA = 0.1942 m/s
Darcy-Weisbach friction factor F' = 0.0504
Calculated from Manning's n = 0.03
Wind velocity UW = 2 m/s
Stratification Type STRCND = U
Surface temperature = 25 degC
Bottom temperature = 25 degC
Calculated FRESH-WATER DENSITY values:
Surface density RHOAS = 997.0456 kg/m³
Bottom density RHOAB = 997.0456 kg/m³

DISCHARGE PARAMETERS:

Submerged Multiport Diffuser Discharge
Diffuser type DITYPE = unidirectional perpendicular
Diffuser length LD = 22.88 m
Nearest bank = left
Diffuser endpoints YB1 = 49.56 m; YB2 = 72.43 m
Number of openings NOPEN = 3
Spacing between risers/openings SPAC = 11.44 m
Port/Nozzle diameter D0 = 0.25 m
with contraction ratio = 1
Equivalent slot width B0 = 0.0064 m
Total area of openings TA0 = 0.1473 m²
Discharge velocity U0 = 0.86 m/s
Total discharge flowrate Q0 = 0.127057 m³/s
Discharge port height H0 = 0.1 m
Nozzle arrangement BETYPE = unidirectional without fanning
Diffuser alignment angle GAMMA = 90 deg
Vertical discharge angle THETA = 15 deg
Horizontal discharge angle SIGMA = 0 deg
Relative orientation angle BETA = 90 deg
Discharge temperature (freshwater) = 37.80 degC
Corresponding density RHO0 = 993.0346 kg/m³
Density difference DRHO = 4.0110 kg/m³
Buoyant acceleration GP0 = 0.0395 m/s²
Discharge concentration C0 = 21.290000 TUA
Surface heat exchange coeff. KS = 0 m/s
Coefficient of decay KD = 0 /s

CORMIX SESSION REPORT: CASE I - 2.9 MGD

XX

FLUX VARIABLES PER UNIT DIFFUSER LENGTH:

Discharge (volume flux)	q0	= 0.005553 m ² /s
Momentum flux	m0	= 0.004791 m ³ /s ²
Buoyancy flux	j0	= 0.000219 m ³ /s ³

DISCHARGE/ENVIRONMENT LENGTH SCALES:

LQ = 0.01 m	Lm = 0.13 m	LM = 1.32 m
lm' = 99999 m	Lb' = 99999 m	La = 99999 m

(These refer to the actual discharge/environment length scales.)

NON-DIMENSIONAL PARAMETERS:

Slot Froude number	FR0	= 54.15
Port/nozzle Froude number	FRD0	= 8.69
Velocity ratio	R	= 4.44

MIXING ZONE / TOXIC DILUTION ZONE / AREA OF INTEREST PARAMETERS:

Toxic discharge	= yes
CMC concentration	CMC = 1 TUA
CCC concentration	CCC = 0.1 TUA
Water quality standard specified	= given by CCC value
Regulatory mixing zone	= yes
Regulatory mixing zone specification	= distance
Regulatory mixing zone value	= 187 m (m ² if area)
Region of interest	= 5600 m

HYDRODYNAMIC CLASSIFICATION:

FLOW CLASS	= MU2	
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This flow configuration applies to a layer corresponding to the full water depth at the discharge site.

Applicable layer depth = water depth = 2.13 m

MIXING ZONE EVALUATION (hydrodynamic and regulatory summary):

X-Y-Z Coordinate system:

Origin is located at the bottom below the port center:

61.00 m from the left bank/shore.

Number of display steps NSTEP = 25 per module.

NEAR-FIELD REGION (NFR) CONDITIONS :

Note: The NFR is the zone of strong initial mixing. It has no regulatory implication. However, this information may be useful for the discharge designer because the mixing in the NFR is usually sensitive to the discharge design conditions.

Pollutant concentration at edge of NFR = 0.278 TUA

Dilution at edge of NFR = 76.6

NFR Location: x = 11.44 m

(centerline coordinates) y = 0 m

z = 2.13 m

NFR plume dimensions: half-width = 11.13 m

thickness = 2.13 m

Cumulative travel time: 55.6775 sec.

CORMIX SESSION REPORT: CASE I - 2.9 MGD

XX

Buoyancy assessment:

The effluent density is less than the surrounding ambient water density at the discharge level.
Therefore, the effluent is POSITIVELY BUOYANT and will tend to rise towards the surface.

Near-field instability behavior:

The diffuser flow will experience instabilities with full vertical mixing in the near-field.
There may be benthic impact of high pollutant concentrations.

FAR-FIELD MIXING SUMMARY:

Plume is vertically fully mixed WITHIN NEAR-FIELD (or a fraction thereof), but RE-STRATIFIES LATER.
Plume becomes vertically fully mixed again at 396.62 m downstream.

PLUME BANK CONTACT SUMMARY:

Plume in bounded section does not contact bank.

***** TOXIC DILUTION ZONE SUMMARY *****

Recall: The TDZ corresponds to the three (3) criteria issued in the USEPA Technical Support Document (TSD) for Water Quality-based Toxics Control, 1991 (EPA/505/2-90-001).

Criterion maximum concentration (CMC) = 1 TUA
Corresponding dilution = 21.290000
The CMC was encountered at the following plume position:

Plume location: x = 0.86 m
(centerline coordinates) y = 0 m
z = 0.17 m

Plume dimension: half-width = 11.38 m
thickness = 0.18 m

CRITERION 1: This location is within 50 times the discharge length scale of
Lq = 0.22 m.

+++++ The discharge length scale TEST for the TDZ has been SATISFIED. +++++

CRITERION 2: This location is within 5 times the ambient water depth of
HD = 2.13 m.

+++++ The ambient depth TEST for the TDZ has been SATISFIED. +++++

CRITERION 3: This location is within one tenth the distance of the extent of the Regulatory Mixing Zone of 187 m downstream.

+++++ The Regulatory Mixing Zone TEST for the TDZ has been SATISFIED. +++++
The diffuser discharge velocity is equal to 0.86 m/s.

This is below the value of 3.0 m/s recommended in the TSD.

*** All three CMC criteria for the TDZ are SATISFIED for this discharge. ***

***** REGULATORY MIXING ZONE SUMMARY *****

The plume conditions at the boundary of the specified RMZ are as follows:

Pollutant concentration = 0.121531 TUA
Corresponding dilution = 175.7
Plume location: x = 187 m
(centerline coordinates) y = 0 m
z = 2.13 m

Plume dimensions: half-width = 27.53 m
thickness = 2.09 m

Cumulative travel time: 959.3022 sec.

CORMIX SESSION REPORT: CASE I - 2.9 MGD

XX

At this position, the plume is NOT IN CONTACT with any bank.
However, the CCC for the toxic pollutant has not been met within the RMZ.

In particular:
The CCC was encountered at the following plume position:
The CCC for the toxic pollutant was encountered at the following
plume position:

CCC	= 0.1 TUA
Corresponding dilution	= 212.9
Plume location:	x = 330.01 m
(centerline coordinates)	y = 0 m
	z = 2.13 m
Plume dimensions:	half-width = 27.87 m
	thickness = 2.55 m

***** FINAL DESIGN ADVICE AND COMMENTS *****

CORMIX2 uses the TWO-DIMENSIONAL SLOT DIFFUSER CONCEPT to represent the actual three-dimensional diffuser geometry. Thus, it approximates the details of the merging process of the individual jets from each port/nozzle.

In the present design, the spacing between adjacent ports/nozzles (or riser assemblies) is somewhat greater (in the range between three times to ten times) the local water depth. It is unlikely that sufficient lateral interaction of adjacent jets will occur in the near-field. However, the individual jets/plumes may merge soon after in the intermediate-field or in the far-field.

CORMIX2 may have LIMITED APPLICABILITY for this discharge situation.

The results may be somewhat unrealistic in the near-field (minimum dilution may be overpredicted), but appear to be applicable for the intermediate- and far-field processes.

The user is advised to use a subsequent CORMIX1 (single port discharge) analysis, using discharge data for an individual diffuser jet/plume, in order to compare to the present near-field prediction.

REMINDER: The user must take note that HYDRODYNAMIC MODELING by any known technique is NOT AN EXACT SCIENCE.

Extensive comparison with field and laboratory data has shown that the CORMIX predictions on dilutions and concentrations (with associated plume geometries) are reliable for the majority of cases and are accurate to within about +-50% (standard deviation).

As a further safeguard, CORMIX will not give predictions whenever it judges the design configuration as highly complex and uncertain for prediction.

FR0 = 54.15 FRD0 = 8.69 R = 4.44 PL = 125.
(slot) (port/nozzle)

BEGIN MOD241: BUOYANT AMBIENT SPREADING

CORMIX2 PREDICTION FILE: CASE I - 2.9 MGD

[illegible]

Profile definitions:

BV = top-hat thickness, measured vertically
 BH = top-hat half-width, measured horizontally in y-direction
 ZU = upper plume boundary (Z-coordinate)
 ZL = lower plume boundary (Z-coordinate)
 S = hydrodynamic average (bulk) dilution
 C = average (bulk) concentration (includes reaction effects, if any)

Plume Stage 1 (not bank attached):

X	Y	Z	S	C	BV	BH	ZU	ZL
11.44	0.00	2.13	76.6	0.278E+00	2.13	11.76	2.13	0.00
18.17	0.00	2.13	78.9	0.270E+00	2.05	12.55	2.13	0.08
24.91	0.00	2.13	81.2	0.262E+00	1.99	13.32	2.13	0.14
31.64	0.00	2.13	83.7	0.254E+00	1.94	14.08	2.13	0.19
38.38	0.00	2.13	86.2	0.247E+00	1.90	14.81	2.13	0.23
45.11	0.00	2.13	88.8	0.240E+00	1.87	15.52	2.13	0.26
51.85	0.00	2.13	91.6	0.233E+00	1.85	16.22	2.13	0.28
58.58	0.00	2.13	94.4	0.225E+00	1.83	16.90	2.13	0.30
65.32	0.00	2.13	97.4	0.219E+00	1.81	17.57	2.13	0.32
72.05	0.00	2.13	100.6	0.212E+00	1.80	18.22	2.13	0.33
78.79	0.00	2.13	103.8	0.205E+00	1.80	18.87	2.13	0.33
85.52	0.00	2.13	107.3	0.198E+00	1.80	19.50	2.13	0.33
92.26	0.00	2.13	110.8	0.192E+00	1.80	20.12	2.13	0.33
98.99	0.00	2.13	114.6	0.186E+00	1.81	20.74	2.13	0.32
105.73	0.00	2.13	118.5	0.180E+00	1.82	21.34	2.13	0.31
112.46	0.00	2.13	122.6	0.174E+00	1.83	21.94	2.13	0.30
119.20	0.00	2.13	126.8	0.168E+00	1.84	22.53	2.13	0.29
125.93	0.00	2.13	131.3	0.162E+00	1.86	23.11	2.13	0.27
132.66	0.00	2.13	135.9	0.157E+00	1.88	23.68	2.13	0.25
139.40	0.00	2.13	140.7	0.151E+00	1.90	24.25	2.13	0.23
146.13	0.00	2.13	145.7	0.146E+00	1.92	24.81	2.13	0.21
152.87	0.00	2.13	150.9	0.141E+00	1.95	25.36	2.13	0.18
159.60	0.00	2.13	156.3	0.136E+00	1.97	25.91	2.13	0.16
166.34	0.00	2.13	161.9	0.132E+00	2.00	26.45	2.13	0.13
173.07	0.00	2.13	167.6	0.127E+00	2.03	26.98	2.13	0.10
179.81	0.00	2.13	173.6	0.123E+00	2.06	27.52	2.13	0.07

Cumulative travel time = 922.2828 sec

END OF MOD241: BUOYANT AMBIENT SPREADING

Bottom coordinate for FAR-FIELD is determined by average depth, $Z_{FB} = -0.63\text{m}$

BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

Vertical diffusivity (initial value) = 0.657E-02 m²/s
Horizontal diffusivity (initial value) = 0.822E-02 m²/s

Profile definitions:

BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
 = or equal to layer depth, if fully mixed
 BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
 measured horizontally in Y-direction
 ZU = upper plume boundary (Z-coordinate)
 ZL = lower plume boundary (Z-coordinate)
 S = hydrodynamic centerline dilution
 C = centerline concentration (includes reaction effects, if any)

A SUBSEQUENT APPLICATION OF CORMIX1 IS RECOMMENDED to provide more detail for one of the individual jets/plumes in the initial region before merging.

CORMIX SESSION REPORT: CASE II - 3.76 MGD

XX

CORMIX MIXING ZONE EXPERT SYSTEM

CORMIX-GI Version 4.3GT

HYDRO2:Version-4.3.0.2 June,2005

SITE NAME/LABEL: North American Stainless
 DESIGN CASE: Case II - 3.76 MGD
 FILE NAME: C:\Program Files\CORMIX-GI 4.3\95877 North American
 Stainless 3.76 MGD.prd
 Using subsystem CORMIX2: Submerged Multiport Diffuser Discharges
 Start of session: 07/14/2006--14:51:44

SUMMARY OF INPUT DATA:

AMBIENT PARAMETERS:

Cross-section	=	bounded
Width	BS	= 560 m
Channel regularity	ICHREG	= 1
Ambient flowrate	QA	= 300.16 m ³ /s
Average depth	HA	= 2.76 m
Depth at discharge	HD	= 2.13 m
Ambient velocity	UA	= 0.1942 m/s
Darcy-Weisbach friction factor	F	= 0.0504
Calculated from Manning's n		= 0.03
Wind velocity	UW	= 2 m/s
Stratification Type	STRCND	= U
Surface temperature		= 25
degC		
Bottom temperature		= 25 degC
Calculated FRESH-WATER DENSITY values:		
Surface density	RHOAS	= 997.0456 kg/m ³
Bottom density	RHOAB	= 997.0456 kg/m ³

DISCHARGE PARAMETERS:

	Submerged Multiport Diffuser Discharge
Diffuser type	DITYPE = unidirectional perpendicular
Diffuser length	LD = 22.88 m
Nearest bank	= left
Diffuser endpoints	YB1 = 49.56 m; YB2 = 72.43 m
Number of openings	NOPE = 3
Spacing between risers/openings	SPAC = 11.44 m
Port/Nozzle diameter	D0 = 0.25 m
with contraction ratio	= 1
Equivalent slot width	B0 = 0.0064 m
Total area of openings	TA0 = 0.1473 m ²
Discharge velocity	U0 = 1.12 m/s
Total discharge flowrate	Q0 = 0.164736 m ³ /s
Discharge port height	H0 = 0.1 m
Nozzle arrangement	BETTYPE = unidirectional without fanning
Diffuser alignment angle	GAMMA = 90 deg
Vertical discharge angle	THETA = 15 deg
Horizontal discharge angle	SIGMA = 0 deg
Relative orientation angle	BETA = 90 deg
Discharge temperature (freshwater)	= 37.80 degC
Corresponding density	RHO0 = 993.0346 kg/m ³
Density difference	DRHO = 4.0110 kg/m ³
Buoyant acceleration	GP0 = 0.0395 m/s ²
Discharge concentration	C0 = 21.290000 TUA
Surface heat exchange coeff.	KS = 0 m/s
Coefficient of decay	KD = 0 /s

CORMIX SESSION REPORT: CASE II - 3.76 MGD

XX

FLUX VARIABLES PER UNIT DIFFUSER LENGTH:

Discharge (volume flux)	q0	= 0.007200 m ² /s
Momentum flux	m0	= 0.008054 m ³ /s ²
Buoyancy flux	j0	= 0.000284 m ³ /s ³

DISCHARGE/ENVIRONMENT LENGTH SCALES:

LQ = 0.01 m	Lm = 0.21 m	LM = 1.86 m
lm' = 99999 m	Lb' = 99999 m	La = 99999 m

(These refer to the actual discharge/environment length scales.)

NON-DIMENSIONAL PARAMETERS:

Slot Froude number	FR0	= 70.20
Port/nozzle Froude number	FRD0	= 11.26
Velocity ratio	R	= 5.76

MIXING ZONE / TOXIC DILUTION ZONE / AREA OF INTEREST PARAMETERS:

Toxic discharge		= yes
CMC concentration	CMC	= 1 TUA
CCC concentration	CCC	= 0.1 TUA
Water quality standard specified		= given by CCC value
Regulatory mixing zone		= yes
Regulatory mixing zone specification		= distance
Regulatory mixing zone value		= 187 m (m ² if area)
Region of interest		= 5600 m

HYDRODYNAMIC CLASSIFICATION:

FLOW CLASS	= MU2	
------------	-------	--

This flow configuration applies to a layer corresponding to the full water depth at the discharge site.

Applicable layer depth = water depth = 2.13 m

MIXING ZONE EVALUATION (hydrodynamic and regulatory summary):

X-Y-Z Coordinate system:

Origin is located at the bottom below the port center:

61.00 m from the left bank/shore.

Number of display steps NSTEP = 25 per module.

NEAR-FIELD REGION (NFR) CONDITIONS :

Note: The NFR is the zone of strong initial mixing. It has no regulatory implication. However, this information may be useful for the discharge designer because the mixing in the NFR is usually sensitive to the discharge design conditions.

Pollutant concentration at edge of NFR = 0.3542 TUA

Dilution at edge of NFR = 60.1

NFR Location: x = 11.44 m

(centerline coordinates) y = 0 m

z = 2.13 m

NFR plume dimensions: half-width = 10.94 m

thickness = 2.13 m

Cumulative travel time: 53.7564 sec.

CORMIX SESSION REPORT: CASE II - 3.76 MGD

XX

Buoyancy assessment:

The effluent density is less than the surrounding ambient water density at the discharge level.
Therefore, the effluent is POSITIVELY BUOYANT and will tend to rise towards the surface.

Near-field instability behavior:

The diffuser flow will experience instabilities with full vertical mixing in the near-field.
There may be benthic impact of high pollutant concentrations.

FAR-FIELD MIXING SUMMARY:

Plume is vertically fully mixed WITHIN NEAR-FIELD (or a fraction thereof), but RE-STRATIFIES LATER.
Plume becomes vertically fully mixed again at 450.39 m downstream.

PLUME BANK CONTACT SUMMARY:

Plume in bounded section does not contact bank.

***** TOXIC DILUTION ZONE SUMMARY *****

Recall: The TDZ corresponds to the three (3) criteria issued in the USEPA Technical Support Document (TSD) for Water Quality-based Toxics Control, 1991 (EPA/505/2-90-001).

Criterion maximum concentration (CMC) = 1 TUA
Corresponding dilution = 21.290000
The CMC was encountered at the following plume position:

Plume location: x = 1.35 m
(centerline coordinates) y = 0 m
z = 0.21 m

Plume dimension: half-width = 11.29 m
thickness = 0.28 m

CRITERION 1: This location is within 50 times the discharge length scale of
Lq = 0.22 m.

+++++ The discharge length scale TEST for the TDZ has been SATISFIED. +++++

CRITERION 2: This location is within 5 times the ambient water depth of
HD = 2.13 m.

+++++ The ambient depth TEST for the TDZ has been SATISFIED.+++++

CRITERION 3: This location is within one tenth the distance of the extent
of the Regulatory Mixing Zone of 187 m downstream.

+++++ The Regulatory Mixing Zone TEST for the TDZ has been SATISFIED. +++++
The diffuser discharge velocity is equal to 1.12 m/s.

This is below the value of 3.0 m/s recommended in the TSD.

*** All three CMC criteria for the TDZ are SATISFIED for this discharge. ***

***** REGULATORY MIXING ZONE SUMMARY *****

The plume conditions at the boundary of the specified RMZ are as follows:

Pollutant concentration = 0.160436 TUA
Corresponding dilution = 132.7
Plume location: x = 187 m
(centerline coordinates) y = 0 m
z = 2.13 m

Plume dimensions: half-width = 30.06 m
thickness = 1.87 m

Cumulative travel time: 957.2678 sec.

CORMIX SESSION REPORT: CASE II - 3.76 MGD

XX

At this position, the plume is NOT IN CONTACT with any bank.
However, the CCC for the toxic pollutant has not been met within the RMZ.

In particular:

The CCC was encountered at the following plume position:

The CCC for the toxic pollutant was encountered at the following
plume position:

CCC	= 0.1 TUA
Corresponding dilution	= 212.9
Plume location:	x = 414.91 m
(centerline coordinates)	y = 0 m
	z = 2.13 m
Plume dimensions:	half-width = 34.44 m
	thickness = 2.65 m

***** FINAL DESIGN ADVICE AND COMMENTS *****

CORMIX2 uses the TWO-DIMENSIONAL SLOT DIFFUSER CONCEPT to represent the actual three-dimensional diffuser geometry. Thus, it approximates the details of the merging process of the individual jets from each port/nozzle.

In the present design, the spacing between adjacent ports/nozzles (or riser assemblies) is somewhat greater (in the range between three times to ten times) the local water depth. It is unlikely that sufficient lateral interaction of adjacent jets will occur in the near-field. However, the individual jets/plumes may merge soon after in the intermediate-field or in the far-field.

CORMIX2 may have LIMITED APPLICABILITY for this discharge situation.

The results may be somewhat unrealistic in the near-field (minimum dilution may be overpredicted), but appear to be applicable for the intermediate- and far-field processes.

The user is advised to use a subsequent CORMIX1 (single port discharge) analysis, using discharge data for an individual diffuser jet/plume, in order to compare to the present near-field prediction.

REMINDER: The user must take note that HYDRODYNAMIC MODELING by any known technique is NOT AN EXACT SCIENCE.

Extensive comparison with field and laboratory data has shown that the CORMIX predictions on dilutions and concentrations (with associated plume geometries) are reliable for the majority of cases and are accurate to within about +-50% (standard deviation).

As a further safeguard, CORMIX will not give predictions whenever it judges the design configuration as highly complex and uncertain for prediction.

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS

X-Y-Z COORDINATE SYSTEM:

ORIGIN is located at the bottom and the diffuser mid-point:

60.99 m from the LEFT bank/shore.

X-axis points downstream, Y-axis points to left, Z-axis points upward.

```
NSTEP = 25 display intervals per module
```

BEGIN MOD201: DIFFUSER DISCHARGE MODULE

Due to complex near-field motions: EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

Profile definitions:

BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory

BH = top-hat half-width, in horizontal plane normal to trajectory

S = hydrodynamic centerline dilution

C = centerline concentration (includes reaction effects, if any)

X	Y	Z	S	C	BV	BH
0.00	0.00	0.10	1.0	0.213E+02	0.01	11.44

END OF MOD201: DIFFUSER DISCHARGE MODULE

BEGIN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

In this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY MIXED over the entire layer depth (HS = 2.13m).

Full mixing is achieved after a plume distance of about five layer depths from the diffuser.

Profile definitions:

BV = layer depth (vertically mixed)

BH = top-hat half-width, in horizontal plane normal to trajectory

S = hydrodynamic average (bulk) dilution

C = average (bulk) concentration (includes reaction effects, if any)

X	Y	Z	S	C	BV	BH
0.00	0.00	0.10	1.0	0.213E+02	0.01	11.44
0.46	0.00	0.14	12.8	0.166E+01	0.10	11.38
0.92	0.00	0.18	17.7	0.120E+01	0.19	11.33

** CMC HAS BEEN FOUND **

The pollutant concentration in the plume falls below CMC value of 0.100E+01 in the current prediction interval.

BV = top-hat thickness, measured vertically
 BH = top-hat half-width, measured horizontally in y-direction
 ZU = upper plume boundary (Z-coordinate)
 ZL = lower plume boundary (Z-coordinate)
 S = hydrodynamic average (bulk) dilution
 C = average (bulk) concentration (includes reaction effects, if any)

[illegible]

CORMIX SESSION REPORT: CASE III - 4.5 MGD

XX

CORMIX MIXING ZONE EXPERT SYSTEM

CORMIX-GI Version 4.3GT

HYDRO2:Version-4.3.0.2 June,2005

SITE NAME/LABEL: North American Stainless
DESIGN CASE: Case III - 4.5 MGD
FILE NAME: C:\Program Files\CORMIX-GI 4.3\95877 North American
Stainless 4.5 MGD.prd
Using subsystem CORMIX2: Submerged Multiport Diffuser Discharges
Start of session: 07/14/2006--15:09:53

SUMMARY OF INPUT DATA:

AMBIENT PARAMETERS:

Cross-section = bounded
Width BS = 560 m
Channel regularity ICHREG = 1
Ambient flowrate QA = 300.16 m³/s
Average depth HA = 2.76 m
Depth at discharge HD = 2.13 m
Ambient velocity UA = 0.1942 m/s
Darcy-Weisbach friction factor F = 0.0504
Calculated from Manning's n = 0.03
Wind velocity UW = 2 m/s
Stratification Type STRCND = U
Surface temperature = 25
degC
Bottom temperature = 25 degC
Calculated FRESH-WATER DENSITY values:
Surface density RHOAS = 997.0456 kg/m³
Bottom density RHOAB = 997.0456 kg/m³

DISCHARGE PARAMETERS:

Submerged Multiport Diffuser Discharge
Diffuser type DITYPE = unidirectional perpendicular
Diffuser length LD = 22.88 m
Nearest bank = left
Diffuser endpoints YB1 = 49.56 m; YB2 = 72.43 m
Number of openings NOPEN = 3
Spacing between risers/openings SPAC = 11.44 m
Port/Nozzle diameter D0 = 0.25 m
with contraction ratio = 1
Equivalent slot width B0 = 0.0064 m
Total area of openings TA0 = 0.1473 m²
Discharge velocity U0 = 1.34 m/s
Total discharge flowrate Q0 = 0.197157 m³/s
Discharge port height H0 = 0.1 m
Nozzle arrangement BETYPE = unidirectional without fanning
Diffuser alignment angle GAMMA = 90 deg
Vertical discharge angle THETA = 15 deg
Horizontal discharge angle SIGMA = 0 deg
Relative orientation angle BETA = 90 deg
Discharge temperature (freshwater) = 37.80 degC
Corresponding density RHO0 = 993.0346 kg/m³
Density difference DRHO = 4.0110 kg/m³
Buoyant acceleration GP0 = 0.0395 m/s²
Discharge concentration C0 = 21.290000 TUA
Surface heat exchange coeff. KS = 0 m/s
Coefficient of decay KD = 0 /s

CORMIX SESSION REPORT: CASE III - 4.5 MGD

XX

FLUX VARIABLES PER UNIT DIFFUSER LENGTH:

Discharge (volume flux)	q0	= 0.008617 m ² /s
Momentum flux	m0	= 0.011537 m ³ /s ²
Buoyancy flux	j0	= 0.000340 m ³ /s ³

DISCHARGE/ENVIRONMENT LENGTH SCALES:

LQ = 0.01 m	Lm = 0.31 m	LM = 2.37 m
lm' = 99999 m	Lb' = 99999 m	La = 99999 m

(These refer to the actual discharge/environment length scales.)

NON-DIMENSIONAL PARAMETERS:

Slot Froude number	FR0	= 84.02
Port/nozzle Froude number	FRD0	= 13.48
Velocity ratio	R	= 6.89

MIXING ZONE / TOXIC DILUTION ZONE / AREA OF INTEREST PARAMETERS:

Toxic discharge		= yes
CMC concentration	CMC	= 1 TUA
CCC concentration	CCC	= 0.1 TUA
Water quality standard specified		= given by CCC value
Regulatory mixing zone		= yes
Regulatory mixing zone specification		= distance
Regulatory mixing zone value		= 187 m (m ² if area)
Region of interest		= 5600 m

HYDRODYNAMIC CLASSIFICATION:

FLOW CLASS	= MU2	
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This flow configuration applies to a layer corresponding to the full water depth at the discharge site.

Applicable layer depth = water depth = 2.13 m

MIXING ZONE EVALUATION (hydrodynamic and regulatory summary):

X-Y-Z Coordinate system:

Origin is located at the bottom below the port center:
61.00 m from the left bank/shore.

Number of display steps NSTEP = 25 per module.

NEAR-FIELD REGION (NFR) CONDITIONS :

Note: The NFR is the zone of strong initial mixing. It has no regulatory implication. However, this information may be useful for the discharge designer because the mixing in the NFR is usually sensitive to the discharge design conditions.

Pollutant concentration at edge of NFR = 0.4164 TUA

Dilution at edge of NFR = 51.1

NFR Location:	x = 11.44 m
(centerline coordinates)	y = 0 m
	z = 2.13 m

NFR plume dimensions:	half-width = 10.76 m
	thickness = 2.13 m

Cumulative travel time: 51.9088 sec.

CORMIX SESSION REPORT: CASE III - 4.5 MGD

XX

Buoyancy assessment:

The effluent density is less than the surrounding ambient water density at the discharge level.
Therefore, the effluent is POSITIVELY BUOYANT and will tend to rise towards the surface.

Near-field instability behavior:

The diffuser flow will experience instabilities with full vertical mixing in the near-field.
There may be benthic impact of high pollutant concentrations.

FAR-FIELD MIXING SUMMARY:

Plume is vertically fully mixed WITHIN NEAR-FIELD (or a fraction thereof), but RE-STRATIFIES LATER.
Plume becomes vertically fully mixed again at 485.10 m downstream.

PLUME BANK CONTACT SUMMARY:

Plume in bounded section does not contact bank.

***** TOXIC DILUTION ZONE SUMMARY *****

Recall: The TDZ corresponds to the three (3) criteria issued in the USEPA Technical Support Document (TSD) for Water Quality-based Toxics Control, 1991 (EPA/505/2-90-001).

Criterion maximum concentration (CMC) = 1 TUA
Corresponding dilution = 21.290000
The CMC was encountered at the following plume position:

Plume location: x = 1.88 m
(centerline coordinates) y = 0 m
z = 0.26 m

Plume dimension: half-width = 11.17 m
thickness = 0.38 m

CRITERION 1: This location is within 50 times the discharge length scale of
Lq = 0.22 m.

+++++ The discharge length scale TEST for the TDZ has been SATISFIED. ++++++

CRITERION 2: This location is within 5 times the ambient water depth of
HD = 2.13 m.

+++++ The ambient depth TEST for the TDZ has been SATISFIED.+++++

CRITERION 3: This location is within one tenth the distance of the extent
of the Regulatory Mixing Zone of 187 m downstream.

+++++ The Regulatory Mixing Zone TEST for the TDZ has been SATISFIED. ++++++

The diffuser discharge velocity is equal to 1.34 m/s.

This is below the value of 3.0 m/s recommended in the TSD.

*** All three CMC criteria for the TDZ are SATISFIED for this discharge. ***

***** REGULATORY MIXING ZONE SUMMARY *****

The plume conditions at the boundary of the specified RMZ are as follows:

Pollutant concentration = 0.196421 TUA
Corresponding dilution = 108.4
Plume location: x = 187 m
(centerline coordinates) y = 0 m
z = 2.13 m

Plume dimensions: half-width = 31.58 m
thickness = 1.74 m

Cumulative travel time: 955.3227 sec.

CORMIX SESSION REPORT: CASE III - 4.5 MGD

XX

At this position, the plume is NOT IN CONTACT with any bank.

However, the CCC for the toxic pollutant has not been met within the RMZ.

In particular:

The CCC was encountered at the following plume position:

The CCC for the toxic pollutant was encountered at the following

plume position:

CCC = 0.1 TUA

Corresponding dilution = 212.9

Plume location: x = 482.84 m

(centerline coordinates) y = 0 m

z = 2.13 m

Plume dimensions: half-width = 39.26 m

thickness = 2.75 m

***** FINAL DESIGN ADVICE AND COMMENTS *****

CORMIX2 uses the TWO-DIMENSIONAL SLOT DIFFUSER CONCEPT to represent the actual three-dimensional diffuser geometry. Thus, it approximates the details of the merging process of the individual jets from each port/nozzle.

In the present design, the spacing between adjacent ports/nozzles (or riser assemblies) is somewhat greater (in the range between three times to ten times) the local water depth. It is unlikely that sufficient lateral interaction of adjacent jets will occur in the near-field. However, the individual jets/plumes may merge soon after in the intermediate-field or in the far-field.

CORMIX2 may have LIMITED APPLICABILITY for this discharge situation.

The results may be somewhat unrealistic in the near-field (minimum dilution may be overpredicted), but appear to be applicable for the intermediate- and far-field processes.

The user is advised to use a subsequent CORMIX1 (single port discharge) analysis, using discharge data for an individual diffuser jet/plume, in order to compare to the present near-field prediction.

REMINDER: The user must take note that HYDRODYNAMIC MODELING by any known technique is NOT AN EXACT SCIENCE.

Extensive comparison with field and laboratory data has shown that the CORMIX predictions on dilutions and concentrations (with associated plume geometries) are reliable for the majority of cases and are accurate to within about +-50% (standard deviation).

As a further safeguard, CORMIX will not give predictions whenever it judges the design configuration as highly complex and uncertain for prediction.

FR0 = 84.02 FRD0 = 13.48 R = 6.89 PL = 93.
(slot) (port/nozzle)

FLOW CLASSIFICATION

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS

X-Y-Z COORDINATE SYSTEM:

60.99 m from the LEFT bank/shore.

X-axis points downstream, Y-axis points to left, Z-axis points upward.

```
NSTEP = 25 display intervals per module
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BEGIN MOD201: DIFFUSER DISCHARGE MODULE

Due to complex near-field motions: EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

Profile definitions:

BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory

BH = top-hat half-width, in horizontal plane normal to trajectory

S = hydrodynamic centerline dilution

C = centerline concentration (includes reaction effects, if any)

END OF MOD201: DIFFUSER DISCHARGE MODULE

BEGIN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

In this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY

MIXED over the entire layer depth (HS = 2.13m).

Full mixing is achieved after a plume distance of about five layer depths from the diffuser.

Profile definitions:

BV = layer depth (vertically mixed)

BH = top-hat half-width, in horizontal plane normal to trajectory

S = hydrodynamic average (bulk) dilution

C = average (bulk) concentration (includes reaction effects, if any)

** CMC HAS BEEN FOUND **

BV = top-hat thickness, measured vertically
 BH = top-hat half-width, measured horizontally in y-direction
 ZU = upper plume boundary (Z-coordinate)
 ZL = lower plume boundary (Z-coordinate)
 S = hydrodynamic average (bulk) dilution
 C = average (bulk) concentration (includes reaction effects, if any)

** WATER QUALITY STANDARD OR CCC HAS BEEN FOUND **

STEADY STATE TOXICS WASTELOAD ALLOCATION MODEL (SSTWAM2004) – INPUTS – (2.9 MGD)

Permit Writer	Larry Sowder
Date Entered	6/8/2006
Facility Name	North American Stainless
KPDES Number	KY0095877
Outfall Number	001
Case Number	1 (2.9 MGD)
Status:	
Is this an existing facility – Enter “E”	
Is this an existing facility with an increase in pollutant load – Enter “I”	
Is this a new facility – Enter “N”	
Is this a regional facility with an approved up-to-date 201 plan – Enter “R”	
Has the permittee made a successful alternatives analysis/socioeconomic demonstration – Enter “A” E	
Receiving Water Name	Ohio River
Discharge Mile Point	442.25 (530 USCOE)
Public Water Supply Name	Louisville Water Company
Intake Water Name	Ohio River
Intake Mile Point	380.8 (600.6 USCOE)
Total Effluent Flow (Q _T)	2.9 MGD
Receiving Water 7Q10 (Q _{RW7Q10})	10600 cfs
Receiving Water Harmonic Mean (Q _{RWHM})	45300 cfs
Receiving Water pH	7.5
Receiving Water Temperature	28.60 °C
Intake Water 7Q10 (Q _{IW7Q10})	10600 cfs
Intake Water Harmonic Mean (Q _{IWHM})	45300 cfs
Effluent Hardness	3049 (as mg/l CaCO ₃)
Receiving Water Hardness	145 (as mg/l CaCO ₃)
Zone of Initial Dilution (ZID)	76.6
Mixing Zone (MZ)	0.333
Acute to Chronic Ratio (ACR)	0.1
Impaired	Yes
Permittee agrees to accept no mixing zone for bioaccumulative or persistent pollutants prior to 09/08/2014	No

Calculation Methodology

Definitions

Acute to Chronic Ratio	ACR	Total Effluent Flow	Q _T
Aquatic Life Acute Criteria	C _A	Receiving Water 7Q10	Q _{RW7Q10}
Aquatic Life Chronic Criteria	C _C	Receiving Water Harmonic Mean	Q _{RWHM}
Human Health Criteria - Fish Only	C _{HHFO}	Intake Water 7Q10	Q _{IW7Q10}
Human Health Criteria - Fish & Water	C _{HHFW}	Intake Water Harmonic Mean	Q _{IWHM}
End of Pipe Effluent Limit	C _T	Zone of Initial Dilution	ZID
Instream Background Concentration	C _U	Mixing Zone	MZ
Toxicity Units - Acute	TU _a	Toxicity Units - Chronic	TU _c
Effluent Hardness	H _T	Receiving Water Hardness	H _{RW}

STEADY STATE TOXICS WASTELoad ALLOCATION MODEL (SSTWAM2004) – INPUTS – (2.9 MGD)

Aquatic Life - Chemical Specific

Acute

NO ZID given $C_T = C_A$
 ZID given $C_T = (C_A - C_U) \times (ZID)$

Chronic Mixing Zone / Complete Mix

$$C_T = \{C_C[Q_T + (MZ)(Q_{RW7Q10})] - C_U(MZ)(Q_{RW7Q10})\} / Q_T$$

Human Health - Chemical Specific

Fish Only: Mixing Zone / Complete Mix

Carcinogen / Non-Carcinogen	$C_T = \{C_{HHFO}[Q_T + (MZ)(Q_{RWHM})] - C_U(MZ)(Q_{RWHM})\} / Q_T$
-----------------------------	--

Fish & Water Only: Mixing Zone / Applicable at point of withdrawal

Carcinogen	$C_T = \{C_{HHFW}[Q_T + (Q_{IWHM})] - C_U(Q_{IWHM})\} / Q_T$
Non-Carcinogen	$C_T = \{C_{HHFW}[Q_T + (Q_{IW7Q10})] - C_U(Q_{IW7Q10})\} / Q_T$

Aquatic Life - Whole Effluent Toxicity

Acute (Units TU_a)

NO ZID given $CT = CA$
 ZID given $C_T = (C_A - C_U) \times (ZID)$

Chronic Mixing Zone / Complete Mix (Units TU_c)

$$C_T = \{C_C[Q_T + (MZ)(Q_{RW7Q10})] - C_U(MZ)(Q_{RW7Q10})\} / Q_T$$

Conversion of TU_c to TU_a: $TU_a = TU_c \times ACR = TU_a$

Metal Aquatic Criteria

<u>Pollutant</u>	<u>Acute Criteria</u>	<u>Chronic Criteria</u>
Total Recoverable Cadmium	$e^{(1.0166 (\ln \text{Hardness}) - 3.924)}$	$e^{(0.7409 (\ln \text{Hardness}) - 4.719)}$
Chromium III	$e^{(0.8190 (\ln \text{Hardness}) + 3.7256)}$	$e^{(0.8190 (\ln \text{Hardness}) + 0.6848)}$
Total Recoverable Copper	$e^{(0.9422 (\ln \text{Hardness}) - 1.700)}$	$e^{(0.8545 (\ln \text{Hardness}) - 1.702)}$
Total Recoverable Lead	$e^{(1.273 (\ln \text{Hardness}) - 1.460)}$	$e^{(1.273 (\ln \text{Hardness}) - 4.705)}$
Total Recoverable Nickel	$e^{(0.8460 (\ln \text{Hardness}) + 2.255)}$	$e^{(0.8460 (\ln \text{Hardness}) + 0.0584)}$
Total Recoverable Silver	$e^{(1.72 (\ln \text{Hardness}) - 6.59)}$	
Total Recoverable Zinc	$e^{(0.8473 (\ln \text{Hardness}) + 0.884)}$	$e^{(0.8473 (\ln \text{Hardness}) + 0.884)}$

Hardness (as mg/l CaCO₃)

Zone Initial Dilution (ZID)	$H_{RW} + [H_T + H_{RW}] / ZID$
Mixing Zone	$[(Q_{RW7Q10})(MZ)(H_{RW}) + (Q_T)(H_T)] / [(Q_{RW7Q10})(MZ) + (Q_T)]$

Total Ammonia Criteria

Chronic - applies state wide - unionized criteria of 0.05 mg/l $[0.05 * (1 + 10^{(pKa - pH)})] / 1.2$
 $pKa = (0.0902 + (2730 / (273.1 + T)))$ T = Temperature °C

Acute - applies to the Ohio River (ORSANCO Criteria) $[0.411 / (1 + 10^{(7.204 - pH)})] + [58.4 / (1 + 10^{(pH - 7.204)})]$

Bioaccumulative or Persistent

For new facilities after September 8, 2004 mixing zones shall not be granted for bioaccumulative or persistent pollutants of concern.

Mixing zones for bioaccumulative or persistent pollutants of concern assigned prior to September 8, 2004 shall expire no later than September 8, 2014, unless the permittee agrees to expiration of the mixing zone prior to that date.

Therefore, the application of the more stringent criteria of Human Health Fish & Water Consumption, Human Health Fish Only Consumption, and Aquatic Life Chronic shall apply as end-of-pipe effluent limitations.

STEADY STATE TOXICS WASTELOAD ALLOCATION MODEL (SSTWAM2004) – INPUTS – (2.9 MGD)

Antidegradation

If a new facility or an existing facility that will have a pollutant load increase, the effluent limits are halved unless the receiving stream is impaired or the permittee has demonstrated a negative socioeconomic or cost benefit analysis.

Reasonable Potential Analysis

In establishing water quality based effluent conditions the Division of Water must determine if the pollutant concentrations in the discharge will cause, have the reasonable potential to cause, or contribute to an excursion of any water standard. The process by which the Division of Water makes this determination is known as a Reasonable Potential Analysis.

A Reasonable Potential Analysis is performed by first calculating the expected effluent limitations for those pollutants with water quality criteria. The calculated limits are then compared to the concentrations reported on the KPDES permit application and/or a summarization of the values reported on the Discharge Monitoring Report (DMRs) submitted during the term of the permit. This comparison is made by dividing the reported value by the calculated effluent limitation and converting to a percentage. The following criteria are used in determining how the pollutant will be addressed in the permit.

New Permits or New Pollutants on Permit Renewals

If the reported concentration is less than 70% of the calculated effluent limit then no monitoring or limitations will be required.

If the reported concentration is equal to or greater than 70% but less than 90% of the calculated effluent limit then monitoring will be required.

If the reported concentration is equal to or greater than 90% and the number of analysis reported on the KPDES permit application is less than 12 then monitoring will be required.

If the reported concentration is equal to or greater than 90% and the number of analysis reported on the KPDES permit application is equal or greater than 12 then an effluent limitation will be required.

Permit Renewals - Existing Pollutants

If the reported concentration is less than 70% of the calculated effluent limit then and the source of the reported concentration was the DMRs for that facility and there were more than 12 DMRs utilized to determine the reported concentrations then the pollutant will be removed from the permit.

If the reported concentration is equal to or greater than 70% but less than 90% of the calculated effluent limit then monitoring will be required.

If the reported concentration is equal to or greater than 90% then an effluent limitation will be required.

In all cases, the Division of Water still may exercise its Best Professional Judgment in the implementation of the results.

STEADY STATE TOXICS WASTELOAD ALLOCATION MODEL (SSTWAM2004) – OUTPUTS – (2.9 MGD)

Parameter	CAS Number	Carcinogen	Bioaccumulative or Persistent	Effluent Limitations					
				Average	Units	Justification	Maximum	Units	Justification
1,1,1-Trichloroethane	71556	No	No	472.4483	mg/l	Human Health Fish & Water	N/A	mg/l	NA
1,1,2,2-Tetrachloroethane	79345	Yes	No	1.7156	mg/l	Human Health Fish & Water	N/A	mg/l	NA
1,1,2-Trichloroethane	79005	Yes	No	5.9543	mg/l	Human Health Fish & Water	N/A	mg/l	NA
1,1-Dichloroethylene	75354	Yes	No	0.5752	mg/l	Human Health Fish & Water	N/A	mg/l	NA
1,2,4,5-Tetrachlorobenzene	95943	No	Yes	2.2914	mg/l	Human Health Fish & Water	N/A	mg/l	NA
1,2,4-Trichlorobenzene	120821	No	No	614.1828	mg/l	Human Health Fish & Water	N/A	mg/l	NA
1,2-Dichlorobenzene	95501	No	No	6378.0517	mg/l	Human Health Fish & Water	N/A	mg/l	NA
1,2-Dichloroethane	107062	Yes	No	3.8349	mg/l	Human Health Fish & Water	N/A	mg/l	NA
1,2-Dichloropropane	78875	Yes	No	0.5046	mg/l	Human Health Fish & Water	N/A	mg/l	NA
1,2-Diphenylhydrazine	122667	Yes	No	0.3633	mg/l	Human Health Fish & Water	N/A	mg/l	NA
1,2-Trans-Dichloroethylene	156605	Yes	No	7.064	mg/l	Human Health Fish & Water	N/A	mg/l	NA
1,3-Dichlorobenzene	541731	No	No	755.9172	mg/l	Human Health Fish & Water	N/A	mg/l	NA
1,3-Dichloropropene	542756	No	No	23.6224	mg/l	Human Health Fish & Water	N/A	mg/l	NA
1,4-Dichlorobenzene	106467	No	No	944.8966	mg/l	Human Health Fish & Water	N/A	mg/l	NA
2,3,7,8 Tetrachlorodibenzo P Dioxin	1746016	Yes	Yes	1.7143E-08	mg/l	Human Health Fish Only	N/A	mg/l	NA
2,4,5-TP (Silvex)	93721	No	No	23.6224	mg/l	Human Health Fish & Water	N/A	mg/l	NA
2,4,5-trichlorophenol	95954	No	No	4252.0345	mg/l	Human Health Fish & Water	N/A	mg/l	NA
2,4,6-Trichlorophenol	88062	Yes	No	8.0671	mg/l	Human Health Fish Only	N/A	mg/l	NA
2,4-D	94757	Yes	No	706.4376	mg/l	Human Health Fish & Water	N/A	mg/l	NA
2,4-Dichlorophenol	120832	No	No	181.8926	mg/l	Human Health Fish & Water	N/A	mg/l	NA
2,4-Dimethylphenol	105679	No	No	897.6517	mg/l	Human Health Fish & Water	N/A	mg/l	NA
2,4-Dinitrophenol	51285	No	No	162.9947	mg/l	Human Health Fish & Water	N/A	mg/l	NA
2,4-Dinitrotoluene	121142	Yes	No	1.1101	mg/l	Human Health Fish & Water	N/A	mg/l	NA
2-Chloronaphthalene	91587	No	No	2362.2414	mg/l	Human Health Fish & Water	N/A	mg/l	NA
2-Chlorophenol	95578	No	No	191.3416	mg/l	Human Health Fish & Water	N/A	mg/l	NA
2-methyl-4,6-dinitrophenol	534521	No	No	30.7091	mg/l	Human Health Fish & Water	N/A	mg/l	NA
3,3-Dichlorobenzidine	91941	Yes	No	0.0941	mg/l	Human Health Fish Only	N/A	mg/l	NA
4,4'-DDD	72548	Yes	Yes	1.0420E-03	mg/l	Human Health Fish Only	N/A	mg/l	NA
4,4'-DDE	72559	Yes	Yes	7.3948E-04	mg/l	Human Health Fish Only	N/A	mg/l	NA
4,4'-DDT	50293	Yes	Yes	7.3948E-04	mg/l	Human Health Fish Only	0.0843	mg/l	Acute
Acenaphthene	83329	No	No	1582.7017	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Acrolein	107028	No	No	448.8259	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Acrylonitrile	107131	Yes	No	0.5147	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Aldrin	309002	Yes	No	1.6806E-04	mg/l	Human Health Fish Only	0.2298	mg/l	Acute
alpha-BHC	319846	Yes	No	1.6470E-02	mg/l	Human Health Fish Only	N/A	mg/l	NA
Alpha-Endosulfan	959988	No	No	0.0169	mg/l	Chronic	0.0169	mg/l	Acute
Anthracene	120127	No	No	19606.6034	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Asbestos	1332214	Yes	No	70643758.6207	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Benzene	71432	Yes	No	22.2023	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Benzidine	92875	Yes	No	6.7226E-04	mg/l	Human Health Fish Only	N/A	mg/l	NA
Benzo(a)anthracene	56553	Yes	No	3.8349E-02	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Benzo(a)pyrene	50328	Yes	No	3.8349E-02	mg/l	Human Health Fish & Water	N/A	mg/l	NA

STEADY STATE TOXICS WASTELOAD ALLOCATION MODEL (SSTWAM2004) – OUTPUTS – (2.9 MGD)

<u>Parameter</u>	<u>CAS Number</u>	<u>Carcinogen</u>	<u>Bioaccumulative or Persistent</u>	<u>Effluent Limitations</u>				
				<u>Average</u>	<u>Units</u>	<u>Justification</u>	<u>Maximum</u>	<u>Units</u> <u>Justification</u>
Benzo(b)fluoranthene	205992	Yes	No	3.8349E-02	mg/l	Human Health Fish & Water	N/A	mg/l NA
Benzo(k)fluoranthene	205992	Yes	No	3.8349E-02	mg/l	Human Health Fish & Water	N/A	mg/l NA
Beta-BHC	319857	Yes	No	5.7142E-02	mg/l	Human Health Fish Only	N/A	mg/l NA
Beta-Endosulfan	33213659	No	No	0.0169	mg/l	Chronic	0.0169	mg/l Acute
Bis(2-chloroethyl)ether	111444	Yes	No	0.3028	mg/l	Human Health Fish & Water	N/A	mg/l NA
Bis(2-chloroisopropyl)ether	108601	No	No	3307.1379	mg/l	Human Health Fish & Water	N/A	mg/l NA
Bis(2-ethylhexyl)phthalate	117817	Yes	No	7.3948	mg/l	Human Health Fish Only	N/A	mg/l NA
Bis(chloromethyl)ether	542881	Yes	No	0.0010	mg/l	Human Health Fish Only	N/A	mg/l NA
Bromoform	75252	Yes	No	43.3955	mg/l	Human Health Fish & Water	N/A	mg/l NA
Butylbenzyl phthalate	85687	No	No	3543.3621	mg/l	Human Health Fish & Water	N/A	mg/l NA
Carbon Tetrachloride	56235	Yes	No	2.3212	mg/l	Human Health Fish & Water	N/A	mg/l NA
Chlordane	57749	Yes	Yes	2.7226E-03	mg/l	Human Health Fish Only	0.1838	mg/l Acute
Chloride	16887006	No	No	91920.0000	mg/l	Chronic	91920.0000	mg/l Acute
Chlorobenzene	108907	No	No	1606.3241	mg/l	Human Health Fish & Water	N/A	mg/l NA
Chlorodibromomethane	124481	Yes	No	4.0368	mg/l	Human Health Fish & Water	N/A	mg/l NA
Chloroform	67663	Yes	No	57.5242	mg/l	Human Health Fish & Water	N/A	mg/l NA
Chloropyrifos	2921882	No	No	0.0064	mg/l	Chronic	6.3578E-03	mg/l Acute
Chromium (III)	16065831	No	No	93.2185	mg/l	Chronic	226.4702	mg/l Acute
Chromium (VI)	18540299	Yes	No	1.2256	mg/l	Chronic	1.2256	mg/l Acute
Chrysene	218019	Yes	No	3.8349E-02	mg/l	Human Health Fish & Water	N/A	mg/l NA
Color		No	No	177.1681	mg/l	Human Health Fish & Water	N/A	mg/l NA
Demeton	8065483	No	No	0.0787	mg/l	Chronic	N/A	mg/l NA
Dibenzo(a,h)anthracene	53703	Yes	No	3.8349E-02	mg/l	Human Health Fish & Water	N/A	mg/l NA
Dichlorobromomethane	75274	Yes	No	5.5506	mg/l	Human Health Fish & Water	N/A	mg/l NA
Dieldrin	60571	Yes	Yes	1.8151E-04	mg/l	Human Health Fish Only	0.0184	mg/l Acute
Diethyl phthalate	84662	No	No	40158.1034	mg/l	Human Health Fish & Water	N/A	mg/l NA
Dimethyl phthalate	131113	No	No	637805.1724	mg/l	Human Health Fish & Water	N/A	mg/l NA
Di-n-butyl phthalate	84742	No	No	4724.4828	mg/l	Human Health Fish & Water	N/A	mg/l NA
Dinitrophenols	25550587	No	No	162.9947	mg/l	Human Health Fish & Water	N/A	mg/l NA
Endosulfan sulfate	1031078	No	No	146.4590	mg/l	Human Health Fish & Water	N/A	mg/l NA
Endrin	72208	No	No	0.0066	mg/l	Chronic	0.0066	mg/l Acute
Endrin aldehyde	7421934	No	No	0.6851	mg/l	Human Health Fish & Water	N/A	mg/l NA
Ethylbenzene	100414	No	No	7322.9483	mg/l	Human Health Fish & Water	N/A	mg/l NA
Fluoranthene	206440	No	No	307.0914	mg/l	Human Health Fish & Water	N/A	mg/l NA
Fluorene	86737	No	No	2598.4655	mg/l	Human Health Fish & Water	N/A	mg/l NA
Fluoride		No	No	4724.4828	mg/l	Human Health Fish & Water	N/A	mg/l NA
Free Cyanide	57125	No	No	1.6852	mg/l	Chronic	1.6852	mg/l Acute
gamma-BHC (Lindane)	58899	Yes	Yes	7.2770E-02	mg/l	Human Health Fish & Water	0.0728	mg/l Acute
Guthion	86500	No	No	7.8729E-03	mg/l	Chronic	N/A	mg/l NA
Heptachlor	76448	Yes	No	2.6554E-04	mg/l	Human Health Fish Only	0.0398	mg/l Acute
Heptachlor epoxide	1024573	Yes	No	1.3109E-04	mg/l	Human Health Fish Only	0.0398	mg/l Acute
Hexachlorobenzene	118741	Yes	Yes	9.7477E-04	mg/l	Human Health Fish Only	N/A	mg/l NA

STEADY STATE TOXICS WASTELOAD ALLOCATION MODEL (SSTWAM2004) – OUTPUTS – (2.9 MGD)

				<u>Effluent Limitations</u>					
			<u>Bioaccumulative</u>						
<u>Parameter</u>	<u>CAS Number</u>	<u>Carcinogen</u>	<u>or Persistent</u>	<u>Average</u>	<u>Units</u>	<u>Justification</u>	<u>Maximum</u>	<u>Units</u>	<u>Justification</u>
Hexachlorobutadiene	87683	Yes	Yes	4.4405	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Hexachlorocyclo-hexane-Technical	319868	Yes	Yes	1.2413E-01	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Hexachlorocyclopentadiene	77474	No	No	566.9379	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Hexachloroethane	67721	Yes	No	11.0923	mg/l	Human Health Fish Only	N/A	mg/l	NA
Hydrogen Sulfide, Undissociated	7783064	No	No	1.5746	mg/l	Chronic	N/A	mg/l	NA
Ideno(1,2,3-cd)pyrene	193395	No	No	8.9765E-03	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Isophorone	78591	No	No	82.6784	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Malathion	121755	No	No	0.0787	mg/l	Chronic	N/A	mg/l	NA
Methoxychlor	72435	No	No	0.0236	mg/l	Chronic	N/A	mg/l	NA
Methyl Bromide	74839	No	No	111.0253	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Methylene Chloride	75092	Yes	No	46.4230	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Mirex	2385855	Yes	Yes	7.8729E-04	mg/l	Chronic	N/A	mg/l	NA
Nitrate-Nitrite (as N)	14797558	No	No	23622.4138	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Nitrobenzene	98953	No	No	40.1581	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Nitrosamines, Other		No	No	1.8898E-03	mg/l	Human Health Fish & Water	N/A	mg/l	NA
N-Nitrosodibutylamine	924163	Yes	No	0.0636	mg/l	Human Health Fish & Water	N/A	mg/l	NA
N-Nitrosodiethylamine	55185	Yes	No	8.0736E-03	mg/l	Human Health Fish & Water	N/A	mg/l	NA
N-Nitrosodimethylamine	62759	Yes	No	6.9635E-03	mg/l	Human Health Fish & Water	N/A	mg/l	NA
N-Nitrosodi-n-Propylamine	621647	Yes	No	0.0505	mg/l	Human Health Fish & Water	N/A	mg/l	NA
N-Nitrosodiphenylamine	86306	Yes	No	20.1677	mg/l	Human Health Fish Only	N/A	mg/l	NA
N-Nitrosopyrrolidine	930552	Yes	No	0.1615	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Parathion	56382	Yes	No	4.9790E-03	mg/l	Chronic	0.0050	mg/l	Acute
Pentachlorobenzene	608935	Yes	Yes	5.0419	mg/l	Human Health Fish Only	N/A	mg/l	NA
Pentachlorophenol	87865	Yes	No	2.7248	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Phenol	108952	No	No	49607.0690	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Phthalate esters			No	2.3619	mg/l	Chronic	N/A	mg/l	NA
Polychlorinated Biphenyls (PCBs)		Yes	Yes	2.1512E-04	mg/l	Human Health Fish Only	N/A	mg/l	NA
Pyrene	129000	No	No	1960.6603	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Sulfate (as SO4)		No	No	590560.3448	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Surfactants		No	No	1181.1207	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Tetrachloroethylene	127184	Yes	No	6.9635	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Toluene	108883	No	No	16063.2414	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Total Alpha		No	No	N/A	pCi/l	Human Health Fish & Water	1149.0000	pCi/l	Acute
Total Ammonia		No	No	1364.4028	mg/l	Chronic	1523.5851	mg/l	Acute
Total Beta		No	No	N/A	pCi/l	Human Health Fish & Water	3830.0000	pCi/l	Acute
Total Dissolved Solids			No	1771681.0345	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Total Radium		No	No	N/A	pCi/l	Human Health Fish & Water	383.0000	pCi/l	Acute
Total Strontium-90		No	No	N/A	pCi/l	Human Health Fish & Water	612.8000	pCi/l	Acute
Total Recoverable Antimony	7440360	No	No	13.2286	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Total Recoverable Arsenic	7440382	Yes	No	0.5038	mg/l	Chronic	25.9676	mg/l	Acute
Total Recoverable Barium	7440393	No	No	2362.2414	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Total Recoverable Beryllium	7440417	No	No	9.4490	mg/l	Human Health Fish & Water	N/A	mg/l	NA

STEADY STATE TOXICS WASTELOAD ALLOCATION MODEL (SSTWAM2004) – OUTPUTS – (2.9 MGD)

				<u>Effluent Limitations</u>					
<u>Parameter</u>	<u>CAS Number</u>	<u>Carcinogen</u>	<u>Bioaccumulative or Persistent</u>	<u>Average</u>	<u>Units</u>	<u>Justification</u>	<u>Maximum</u>	<u>Units</u>	<u>Justification</u>
Total Recoverable Cadmium	7440439	No	No	0.2840	mg/l	Chronic	0.3019	mg/l	Acute
Total Recoverable Chromium	7440439	No	No	232.8476	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Total Recoverable Copper	7440508	No	No	1.7425	mg/l	Human Health Fish & Water	1.7425	mg/l	Acute
Total Recoverable Iron	7439896	No	No	N/A	mg/l	Human Health Fish Only	219.6888	mg/l	Acute
Total Recoverable Lead	7439921	No	No	4.1041	mg/l	Chronic	13.4893	mg/l	Acute
Total Recoverable Mercury	7439976	No	Yes	1.3022E-01	mg/l	Human Health Fish Only	0.1302	mg/l	Acute
Total Recoverable Nickel	7440020	No	No	59.7150	mg/l	Human Health Fish & Water	59.7150	mg/l	Acute
Total Recoverable Selenium	7782492	No	No	1.5320	mg/l	Chronic	1.5320	mg/l	Acute
Total Recoverable Silver	7440224	No	No	N/A	mg/l	Human Health Fish & Water	0.8190	mg/l	Acute
Total Recoverable Thallium	7440280	No	No	4.0158	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Total Recoverable Zinc	7440666	No	No	14.8186	mg/l	Human Health Fish & Water	14.8186	mg/l	Acute
Total Residual Chlorine		No	No	1.4554	mg/l	Chronic	1.4554	mg/l	Acute
Toxaphene	8001352	Yes	Yes	1.5746E-04	mg/l	Chronic	0.0559	mg/l	Acute
Trichloroethylene	79016	Yes	No	25.2299	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Tritium		No	No	N/A	pCi/l	Human Health Fish & Water	1532000.0000	pCi/l	Acute
Uranium		No	No	N/A	mg/l	Human Health Fish & Water	2.2980	mg/l	Acute
Vinyl Chloride	75014	Yes	No	20.1839	mg/l	Human Health Fish & Water	N/A	mg/l	NA
<u>Hardness</u>				<u>Chronic</u>		<u>Acute</u>			
Metal limitations are developed using the mixed hardness of the effluent and receiving waters				147.38		182.91			

Toxicity

<u>Type of Test</u>	<u>Maximum</u>	<u>Units</u>	<u>Justification</u>
Acute	22.98	TUa	Acute

STEADY STATE TOXICS WASTELOAD ALLOCATION MODEL (SSTWAM2004) – REASONABLE POTENTIAL ANALYSIS – (2.9 MGD)

<u>Parameter</u>	<u>CAS Number</u>	<u>Carcinogen</u>	<u>Bioaccumulative or Persistent</u>	<u>Reasonable Potential</u>				
				<u>Average Percentage</u>	<u>Maximum Percentage</u>	<u>Data Source</u>	<u>Average</u>	<u>Maximum</u>
1,1,1-Trichloroethane	71556	No	No	0.00%	0.00%	Application	None	None
1,1,2,2-Tetrachloroethane	79345	Yes	No	0.00%	0.00%	Application	None	None
1,1,2-Trichloroethane	79005	Yes	No	0.00%	0.00%	Application	None	None
1,1-Dichloroethylene	75354	Yes	No	0.00%	0.00%	Application	None	None
1,2,4,5-Tetrachlorobenzene	95943	No	Yes	0.00%	0.00%	Application	None	None
1,2,4-Trichlorobenzene	120821	No	No	0.00%	0.00%	Application	None	None
1,2-Dichlorobenzene	95501	No	No	0.00%	0.00%	Application	None	None
1,2-Dichloroethane	107062	Yes	No	0.00%	0.00%	Application	None	None
1,2-Dichloropropane	78875	Yes	No	0.00%	0.00%	Application	None	None
1,2-Diphenylhydrazine	122667	Yes	No	0.00%	0.00%	Application	None	None
1,2-Trans-Dichloroethylene	156605	Yes	No	0.00%	0.00%	Application	None	None
1,3-Dichlorobenzene	541731	No	No	0.00%	0.00%	Application	None	None
1,3-Dichloropropene	542756	No	No	0.00%	0.00%	Application	None	None
1,4-Dichlorobenzene	106467	No	No	0.00%	0.00%	Application	None	None
2,3,7,8 Tetrachlorodibenzo P Dioxin	1746016	Yes	Yes	0.00%	0.00%	Application	None	None
2,4,5-TP (Silvex)	93721	No	No	0.00%	0.00%	Application	None	None
2,4,5-trichlorophenol	95954	No	No	0.00%	0.00%	Application	None	None
2,4,6-Trichlorophenol	88062	Yes	No	0.00%	0.00%	Application	None	None
2,4-D	94757	Yes	No	0.00%	0.00%	Application	None	None
2,4-Dichlorophenol	120832	No	No	0.00%	0.00%	Application	None	None
2,4-Dimethylphenol	105679	No	No	0.00%	0.00%	Application	None	None
2,4-Dinitrophenol	51285	No	No	0.00%	0.00%	Application	None	None
2,4-Dinitrotoluene	121142	Yes	No	0.00%	0.00%	Application	None	None
2-Chloronaphthalene	91587	No	No	0.00%	0.00%	Application	None	None
2-Chlorophenol	95578	No	No	0.00%	0.00%	Application	None	None
2-methyl-4,6-dinitrophenol	534521	No	No	0.00%	0.00%	Application	None	None
3,3-Dichlorobenzidine	91941	Yes	No	0.00%	0.00%	Application	None	None
4,4'-DDD	72548	Yes	Yes	0.00%	0.00%	Application	None	None
4,4'-DDE	72559	Yes	Yes	0.00%	0.00%	Application	None	None
4,4'-DDT	50293	Yes	Yes	0.00%	0.00%	Application	None	None
Acenaphthene	83329	No	No	0.00%	0.00%	Application	None	None
Acrolein	107028	No	No	0.00%	0.00%	Application	None	None
Acrylonitrile	107131	Yes	No	0.00%	0.00%	Application	None	None
Aldrin	309002	Yes	No	0.00%	0.00%	Application	None	None
alpha-BHC	319846	Yes	No	0.00%	0.00%	Application	None	None
Alpha-Endosulfan	959988	No	No	0.00%	0.00%	Application	None	None
Anthracene	120127	No	No	0.00%	0.00%	Application	None	None
Asbestos	1332214	Yes	No	0.00%	0.00%	Application	None	None
Benzene	71432	Yes	No	0.00%	0.00%	Application	None	None
Benzidine	92875	Yes	No	0.00%	0.00%	Application	None	None
Benzo(a)anthracene	56553	Yes	No	0.00%	0.00%	Application	None	None
Benzo(a)pyrene	50328	Yes	No	0.00%	0.00%	Application	None	None

STEADY STATE TOXICS WASTELOAD ALLOCATION MODEL (SSTWAM2004) – REASONABLE POTENTIAL ANALYSIS – (2.9 MGD)

<u>Parameter</u>	<u>CAS Number</u>	<u>Carcinogen</u>	<u>Bioaccumulative or Persistent</u>	<u>Reasonable Potential</u>				
				<u>Average Percentage</u>	<u>Maximum Percentage</u>	<u>Data Source</u>	<u>Average</u>	<u>Maximum</u>
Benzo(b)fluoranthene	205992	Yes	No	0.00%	0.00%	Application	None	None
Benzo(k)fluoranthene	205992	Yes	No	0.00%	0.00%	Application	None	None
Beta-BHC	319857	Yes	No	0.00%	0.00%	Application	None	None
Beta-Endosulfan	33213659	No	No	0.00%	0.00%	Application	None	None
Bis(2-chloroethyl)ether	111444	Yes	No	0.00%	0.00%	Application	None	None
Bis(2-chloroisopropyl)ether	108601	No	No	0.00%	0.00%	Application	None	None
Bis(2-ethylhexyl)phthalate	117817	Yes	No	0.00%	0.00%	Application	None	None
Bis(chloromethyl)ether	542881	Yes	No	0.00%	0.00%	Application	None	None
Bromoform	75252	Yes	No	0.00%	0.00%	Application	None	None
Butylbenzyl phthalate	85687	No	No	0.00%	0.00%	Application	None	None
Carbon Tetrachloride	56235	Yes	No	0.00%	0.00%	Application	None	None
Chlordane	57749	Yes	Yes	0.00%	0.00%	Application	None	None
Chloride	16887006	No	No	0.00%	0.00%	Application	None	None
Chlorobenzene	108907	No	No	0.00%	0.00%	Application	None	None
Chlorodibromomethane	124481	Yes	No	0.00%	0.00%	Application	None	None
Chloroform	67663	Yes	No	0.00%	0.00%	Application	None	None
Chloropyrifos	2921882	No	No	0.00%	0.00%	Application	None	None
Chromium (III)	16065831	No	No	0.00%	0.00%	Application	None	None
Chromium (VI)	18540299	Yes	No	0.00%	0.00%	Application	None	None
Chrysene	218019	Yes	No	0.00%	0.00%	Application	None	None
Color		No	No	0.00%	0.00%	Application	None	None
Demeton	8065483	No	No	0.00%	0.00%	Application	None	None
Dibenzo(a,h)anthracene	53703	Yes	No	0.00%	0.00%	Application	None	None
Dichlorobromomethane	75274	Yes	No	0.00%	0.00%	Application	None	None
Dieldrin	60571	Yes	Yes	0.00%	0.00%	Application	None	None
Diethyl phthalate	84662	No	No	0.00%	0.00%	Application	None	None
Dimethyl phthalate	131113	No	No	0.00%	0.00%	Application	None	None
Di-n-butyl phthalate	84742	No	No	0.00%	0.00%	Application	None	None
Dinitrophenols	25550587	No	No	0.00%	0.00%	Application	None	None
Endosulfan sulfate	1031078	No	No	0.00%	0.00%	Application	None	None
Endrin	72208	No	No	0.00%	0.00%	Application	None	None
Endrin aldehyde	7421934	No	No	0.00%	0.00%	Application	None	None
Ethylbenzene	100414	No	No	0.00%	0.00%	Application	None	None
Fluoranthene	206440	No	No	0.00%	0.00%	Application	None	None
Fluorene	86737	No	No	0.00%	0.00%	Application	None	None
Fluoride		No	No	0.00%	0.00%	Application	None	None
Free Cyanide	57125	No	No	0.00%	0.00%	Application	None	None
gamma-BHC (Lindane)	58899	Yes	Yes	0.00%	0.00%	Application	None	None
Guthion	86500	No	No	0.00%	0.00%	Application	None	None
Heptachlor	76448	Yes	No	0.00%	0.00%	Application	None	None
Heptachlor epoxide	1024573	Yes	No	0.00%	0.00%	Application	None	None
Hexachlorobenzene	118741	Yes	Yes	0.00%	0.00%	Application	None	None

STEADY STATE TOXICS WASTELOAD ALLOCATION MODEL (SSTWAM2004) – REASONABLE POTENTIAL ANALYSIS – (2.9 MGD)

<u>Parameter</u>	<u>CAS Number</u>	<u>Carcinogen</u>	<u>Bioaccumulative or Persistent</u>	<u>Reasonable Potential</u>				
				<u>Average Percentage</u>	<u>Maximum Percentage</u>	<u>Data Source</u>	<u>Average</u>	<u>Maximum</u>
Hexachlorobutadiene	87683	Yes	Yes	0.00%	0.00%	Application	None	None
Hexachlorocyclo-hexane-Technical	319868	Yes	Yes	0.00%	0.00%	Application	None	None
Hexachlorocyclopentadiene	77474	No	No	0.00%	0.00%	Application	None	None
Hexachloroethane	67721	Yes	No	0.00%	0.00%	Application	None	None
Hydrogen Sulfide, Undissociated	7783064	No	No	0.00%	0.00%	Application	None	None
Ideno(1,2,3-cd)pyrene	193395	No	No	0.00%	0.00%	Application	None	None
Isophorone	78591	No	No	0.00%	0.00%	Application	None	None
Malathion	121755	No	No	0.00%	0.00%	Application	None	None
Methoxychlor	72435	No	No	0.00%	0.00%	Application	None	None
Methyl Bromide	74839	No	No	0.00%	0.00%	Application	None	None
Methylene Chloride	75092	Yes	No	0.00%	0.00%	Application	None	None
Mirex	2385855	Yes	Yes	0.00%	0.00%	Application	None	None
Nitrate-Nitrite (as N)	14797558	No	No	0.00%	0.00%	Application	None	None
Nitrobenzene	98953	No	No	0.00%	0.00%	Application	None	None
Nitrosamines, Other		No	No	0.00%	0.00%	Application	None	None
N-Nitrosodibutylamine	924163	Yes	No	0.00%	0.00%	Application	None	None
N-Nitrosodiethylamine	55185	Yes	No	0.00%	0.00%	Application	None	None
N-Nitrosodimethylamine	62759	Yes	No	0.00%	0.00%	Application	None	None
N-Nitrosodi-n-Propylamine	621647	Yes	No	0.00%	0.00%	Application	None	None
N-Nitrosodiphenylamine	86306	Yes	No	0.00%	0.00%	Application	None	None
N-Nitrosopyrrolidine	930552	Yes	No	0.00%	0.00%	Application	None	None
Parathion	56382	Yes	No	0.00%	0.00%	Application	None	None
Pentachlorobenzene	608935	Yes	Yes	0.00%	0.00%	Application	None	None
Pentachlorophenol	87865	Yes	No	0.00%	0.00%	Application	None	None
Phenol	108952	No	No	0.00%	0.00%	Application	None	None
Phthalate esters			No	0.00%	0.00%	Application	None	None
Polychlorinated Biphenyls (PCBs)		Yes	Yes	0.00%	0.00%	Application	None	None
Pyrene	129000	No	No	0.00%	0.00%	Application	None	None
Sulfate (as SO4)		No	No	0.00%	0.00%	Application	None	None
Surfactants		No	No	0.00%	0.00%	Application	None	None
Tetrachloroethylene	127184	Yes	No	0.00%	0.00%	Application	None	None
Toluene	108883	No	No	0.00%	0.00%	Application	None	None
Total Alpha		No	No	0.00%	0.00%	Application	None	None
Total Ammonia		No	No	2.82%	3.87%	Application	None	None
Total Beta		No	No	0.00%	0.00%	Application	None	None
Total Dissolved Solids			No	0.00%	0.00%	Application	None	None
Total Radium		No	No	0.00%	0.00%	Application	None	None
Total Strontium-90		No	No	0.00%	0.00%	Application	None	None
Total Recoverable Antimony	7440360	No	No	0.00%	0.00%	Application	None	None
Total Recoverable Arsenic	7440382	Yes	No	0.00%	0.00%	Application	None	None
Total Recoverable Barium	7440393	No	No	0.00%	0.00%	Application	None	None
Total Recoverable Beryllium	7440417	No	No	0.00%	0.00%	Application	None	None

STEADY STATE TOXICS WASTELOAD ALLOCATION MODEL (SSTWAM2004) – REASONABLE POTENTIAL ANALYSIS – (2.9 MGD)

<u>Parameter</u>	<u>CAS Number</u>	<u>Carcinogen</u>	<u>Bioaccumulative or Persistent</u>	<u>Reasonable Potential</u>				
				<u>Average Percentage</u>	<u>Maximum Percentage</u>	<u>Data Source</u>	<u>Average</u>	<u>Maximum</u>
Total Recoverable Cadmium	7440439	No	No	0.00%	0.00%	Application	None	None
Total Recoverable Chromium	7440439	No	No	0.08%	0.00%	Application	None	None
Total Recoverable Copper	7440508	No	No	0.00%	0.00%	Application	None	None
Total Recoverable Iron	7439896	No	No	0.00%	0.00%	Application	None	None
Total Recoverable Lead	7439921	No	No	0.00%	0.00%	Application	None	None
Total Recoverable Mercury	7439976	No	Yes	0.00%	0.00%	Application	None	None
Total Recoverable Nickel	7440020	No	No	0.00%	0.10%	Application	None	None
Total Recoverable Selenium	7782492	No	No	0.00%	0.00%	Application	None	None
Total Recoverable Silver	7440224	No	No	0.00%	0.00%	Application	None	None
Total Recoverable Thallium	7440280	No	No	0.00%	0.00%	Application	None	None
Total Recoverable Zinc	7440666	No	No	0.00%	0.00%	Application	None	None
Total Residual Chlorine		No	No	0.00%	0.00%	Application	None	None
Toxaphene	8001352	Yes	Yes	0.00%	0.00%	Application	None	None
Trichloroethylene	79016	Yes	No	0.00%	0.00%	Application	None	None
Tritium		No	No	0.00%	0.00%	Application	None	None
Uranium		No	No	0.00%	0.00%	Application	None	None
Vinyl Chloride	75014	Yes	No	0.00%	0.00%	Application	None	None

STEADY STATE TOXICS WASTeload ALLOCATION MODEL (SSTWAM2004) – INPUTS – 3.76 MGD)

Permit Writer	Larry Sowder
Date Entered	6/8/2006
Facility Name	North American Stainless
KPDES Number	KY0095877
Outfall Number	001
Case Number	1 (3.76 MGD)
Status:	
Is this an existing facility – Enter “E”	
Is this an existing facility with an increase in pollutant load – Enter “I”	
Is this a new facility – Enter “N”	
Is this a regional facility with an approved up-to-date 201 plan – Enter “R”	
Has the permittee made a successful alternatives analysis/socioeconomic demonstration – Enter “A”	E
Receiving Water Name	Ohio River
Discharge Mile Point	442.25 (530 USCOE)
Public Water Supply Name	Louisville Water Company
Intake Water Name	Ohio River
Intake Mile Point	380.8 (600.6 USCOE)
Total Effluent Flow (Q_T)	3.76 MGD
Receiving Water 7Q10 (Q_{RW7Q10})	10600 cfs
Receiving Water Harmonic Mean (Q_{RWHM})	45300 cfs
Receiving Water pH	7.5
Receiving Water Temperature	28.60 °C
Intake Water 7Q10 (Q_{IW7Q10})	10600 cfs
Intake Water Harmonic Mean (Q_{IWHM})	45300 cfs
Effluent Hardness	3049 (as mg/l CaCO ₃)
Receiving Water Hardness	145 (as mg/l CaCO ₃)
Zone of Initial Dilution (ZID)	60.1
Mixing Zone (MZ)	0.333
Acute to Chronic Ratio (ACR)	0.1
Impaired	Yes
Permittee agrees to accept no mixing zone for bioaccumulative or persistent pollutants prior to 09/08/2014	No

Calculation Methodology

Definitions

Acute to Chronic Ratio	ACR	Total Effluent Flow	Q_T
Aquatic Life Acute Criteria	C_A	Receiving Water 7Q10	Q_{RW7Q10}
Aquatic Life Chronic Criteria	C_C	Receiving Water Harmonic Mean	Q_{RWHM}
Human Health Criteria - Fish Only	C_{HHFO}	Intake Water 7Q10	Q_{IW7Q10}
Human Health Criteria - Fish & Water	C_{HHFW}	Intake Water Harmonic Mean	Q_{IWHM}
End of Pipe Effluent Limit	C_T	Zone of Initial Dilution	ZID
Instream Background Concentration	C_U	Mixing Zone	MZ
Toxicity Units - Acute	TU_a	Toxicity Units - Chronic	TU_c
Effluent Hardness	H_T	Receiving Water Hardness	H_{RW}

STEADY STATE TOXICS WASTELOAD ALLOCATION MODEL (SSTWAM2004) – INPUTS – 3.76 MGD)

Aquatic Life - Chemical Specific

Acute

NO ZID given $C_T = C_A$
 ZID given $C_T = (C_A - C_U) \times (ZID)$

Chronic Mixing Zone / Complete Mix

$$C_T = \{C_C[Q_T + (MZ)(Q_{RW7Q10})] - [C_U(MZ)(Q_{RW7Q10})]\} / Q_T$$

Human Health - Chemical Specific

Fish Only: Mixing Zone / Complete Mix

Carcinogen / Non-Carcinogen

$$C_T = \{C_{HHFO}[Q_T + (MZ)(Q_{RW7Q10})] - C_U(MZ)(Q_{RW7Q10})\} / Q_T$$

Fish & Water Only: Mixing Zone / Applicable at point of withdrawal

Carcinogen

$$C_T = \{C_{HHFW}[Q_T + (Q_{IWHM})] - C_U(Q_{IWHM})\} / Q_T$$

Non-Carcinogen

$$C_T = \{C_{HHFW}[Q_T + (Q_{IWHM})] - C_U(Q_{IWHM})\} / Q_T$$

Aquatic Life - Whole Effluent Toxicity

Acute (Units TU_a)

NO ZID given $C_T = C_A$
 ZID given $C_T = (C_A - C_U) \times (ZID)$

Chronic Mixing Zone / Complete Mix (Units TU_c)

$$C_T = \{C_C[Q_T + (MZ)(Q_{RW7Q10})] - [C_U(MZ)(Q_{RW7Q10})]\} / Q_T$$

Conversion of TU_c to TU_a: TU_c x ACR = TU_a

Metal Aquatic Criteria

Pollutant

Acute Criteria

Chronic Criteria

Total Recoverable Cadmium

$$e^{(1.0166 (\ln \text{Hardness}) - 3.924)}$$

$$e^{(0.7409 (\ln \text{Hardness}) - 4.719)}$$

Chromium III

$$e^{(0.8190 (\ln \text{Hardness}) + 3.7256)}$$

$$e^{(0.8190 (\ln \text{Hardness}) + 0.6848)}$$

Total Recoverable Copper

$$e^{(0.9422 (\ln \text{Hardness}) - 1.700)}$$

$$e^{(0.8545 (\ln \text{Hardness}) - 1.702)}$$

Total Recoverable Lead

$$e^{(1.273 (\ln \text{Hardness}) - 1.460)}$$

$$e^{(1.273 (\ln \text{Hardness}) - 4.705)}$$

Total Recoverable Nickel

$$e^{(0.8460 (\ln \text{Hardness}) + 2.255)}$$

$$e^{(0.8460 (\ln \text{Hardness}) + 0.0584)}$$

Total Recoverable Silver

$$e^{(1.72 (\ln \text{Hardness}) - 6.59)}$$

$$e^{(0.8473 (\ln \text{Hardness}) + 0.884)}$$

Total Recoverable Zinc

$$e^{(0.8473 (\ln \text{Hardness}) + 0.884)}$$

$$e^{(0.8473 (\ln \text{Hardness}) + 0.884)}$$

Hardness (as mg/l CaCO₃)

Zone Initial Dilution (ZID)

$$H_{RW} + [H_T + H_{RW}] / ZID$$

Mixing Zone

$$[(Q_{RW7Q10})(MZ)(H_{RW}) + (Q_T)(H_T)] / [(Q_{RW7Q10})(MZ) + (Q_T)]$$

Total Ammonia Criteria

Chronic - applies state wide - unionized criteria of 0.05 mg/l

$$[0.05 * (1 + 10^{(pKa - pH)})] / 1.2$$

$$pKa = (0.0902 + (2730 / (273.1 + T))) \quad T = \text{Temperature } ^\circ\text{C}$$

Acute - applies to the Ohio River (ORSANCO Criteria)

$$[0.411 / (1 + 10^{(7.204 - pH)})] + [58.4 / (1 + 10^{(pH - 7.204)})]$$

Bioaccumulative or Persistent

For new facilities after September 8, 2004 mixing zones shall not be granted for bioaccumulative or persistent pollutants of concern.

Mixing zones for bioaccumulative or persistent pollutants of concern assigned prior to September 8, 2004 shall expire no later than September 8, 2014, unless the permittee agrees to expiration of the mixing zone prior to that date.

Therefore, the application of the more stringent criteria of Human Health Fish & Water Consumption, Human Health Fish Only Consumption, and Aquatic Life Chronic shall apply as end-of-pipe effluent limitations.

STEADY STATE TOXICS WASTELOAD ALLOCATION MODEL (SSTWAM2004) – INPUTS – 3.76 MGD)

Antidegradation

If a new facility or an existing facility that will have a pollutant load increase, the effluent limits are halved unless the receiving stream is impaired or the permittee has demonstrated a negative socioeconomic or cost benefit analysis.

Reasonable Potential Analysis

In establishing water quality based effluent conditions the Division of Water must determine if the pollutant concentrations in the discharge will cause, have the reasonable potential to cause, or contribute to an excursion of any water standard. The process by which the Division of Water makes this determination is known as a Reasonable Potential Analysis.

A Reasonable Potential Analysis is performed by first calculating the expected effluent limitations for those pollutants with water quality criteria. The calculated limits are then compared to the concentrations reported on the KPDES permit application and/or a summarization of the values reported on the Discharge Monitoring Report (DMRs) submitted during the term of the permit. This comparison is made by dividing the reported value by the calculated effluent limitation and converting to a percentage. The following criteria are used in determining how the pollutant will be addressed in the permit.

New Permits or New Pollutants on Permit Renewals

If the reported concentration is less than 70% of the calculated effluent limit then no monitoring or limitations will be required.

If the reported concentration is equal to or greater than 70% but less than 90% of the calculated effluent limit then monitoring will be required.

If the reported concentration is equal to or greater than 90% and the number of analysis reported on the KPDES permit application is less than 12 then monitoring will be required.

If the reported concentration is equal to or greater than 90% and the number of analysis reported on the KPDES permit application is equal or greater than 12 then an effluent limitation will be required.

Permit Renewals - Existing Pollutants

If the reported concentration is less than 70% of the calculated effluent limit then and the source of the reported concentration was the DMRs for that facility and there were more than 12 DMRs utilized to determine the reported concentrations then the pollutant will be removed from the permit.

If the reported concentration is equal to or greater than 70% but less than 90% of the calculated effluent limit then monitoring will be required.

If the reported concentration is equal to or greater than 90% then an effluent limitation will be required.

In all cases, the Division of Water still may exercise its Best Professional Judgment in the implementation of the results.

STEADY STATE TOXICS WASTELOAD ALLOCATION MODEL (SSTWAM2004) – OUTPUTS – (3.76 MGD)

Parameter	CAS Number	Carcinogen	Bioaccumulative or Persistent	Effluent Limitations					
				Average	Units	Justification	Maximum	Units	Justification
1,1,1-Trichloroethane	71556	No	No	364.4340	mg/l	Human Health Fish & Water	N/A	mg/l	NA
1,1,2,2-Tetrachloroethane	79345	Yes	No	1.3233	mg/l	Human Health Fish & Water	N/A	mg/l	NA
1,1,2-Trichloroethane	79005	Yes	No	4.5925	mg/l	Human Health Fish & Water	N/A	mg/l	NA
1,1-Dichloroethylene	75354	Yes	No	0.4437	mg/l	Human Health Fish & Water	N/A	mg/l	NA
1,2,4,5-Tetrachlorobenzene	95943	No	Yes	1.7675	mg/l	Human Health Fish & Water	N/A	mg/l	NA
1,2,4-Trichlorobenzene	120821	No	No	473.7643	mg/l	Human Health Fish & Water	N/A	mg/l	NA
1,2-Dichlorobenzene	95501	No	No	4919.8596	mg/l	Human Health Fish & Water	N/A	mg/l	NA
1,2-Dichloroethane	107062	Yes	No	2.9579	mg/l	Human Health Fish & Water	N/A	mg/l	NA
1,2-Dichloropropane	78875	Yes	No	0.3892	mg/l	Human Health Fish & Water	N/A	mg/l	NA
1,2-Diphenylhydrazine	122667	Yes	No	0.2802	mg/l	Human Health Fish & Water	N/A	mg/l	NA
1,2-Trans-Dichloroethylene	156605	Yes	No	5.449	mg/l	Human Health Fish & Water	N/A	mg/l	NA
1,3-Dichlorobenzene	541731	No	No	583.0945	mg/l	Human Health Fish & Water	N/A	mg/l	NA
1,3-Dichloropropene	542756	No	No	18.2217	mg/l	Human Health Fish & Water	N/A	mg/l	NA
1,4-Dichlorobenzene	106467	No	No	728.8681	mg/l	Human Health Fish & Water	N/A	mg/l	NA
2,3,7,8 Tetrachlorodibenzo P Dioxin	1746016	Yes	Yes	1.3223E-08	mg/l	Human Health Fish Only	N/A	mg/l	NA
2,4,5-TP (Silvex)	93721	No	No	18.2217	mg/l	Human Health Fish & Water	N/A	mg/l	NA
2,4,5-trichlorophenol	95954	No	No	3279.9064	mg/l	Human Health Fish & Water	N/A	mg/l	NA
2,4,6-Trichlorophenol	88062	Yes	No	6.2225	mg/l	Human Health Fish Only	N/A	mg/l	NA
2,4-D	94757	Yes	No	544.8748	mg/l	Human Health Fish & Water	N/A	mg/l	NA
2,4-Dichlorophenol	120832	No	No	140.3071	mg/l	Human Health Fish & Water	N/A	mg/l	NA
2,4-Dimethylphenol	105679	No	No	692.4247	mg/l	Human Health Fish & Water	N/A	mg/l	NA
2,4-Dinitrophenol	51285	No	No	125.7297	mg/l	Human Health Fish & Water	N/A	mg/l	NA
2,4-Dinitrotoluene	121142	Yes	No	0.8562	mg/l	Human Health Fish & Water	N/A	mg/l	NA
2-Chloronaphthalene	91587	No	No	1822.1702	mg/l	Human Health Fish & Water	N/A	mg/l	NA
2-Chlorophenol	95578	No	No	147.5958	mg/l	Human Health Fish & Water	N/A	mg/l	NA
2-methyl-4,6-dinitrophenol	534521	No	No	23.6882	mg/l	Human Health Fish & Water	N/A	mg/l	NA
3,3-Dichlorobenzidine	91941	Yes	No	0.0726	mg/l	Human Health Fish Only	N/A	mg/l	NA
4,4'-DDD	72548	Yes	Yes	8.0374E-04	mg/l	Human Health Fish Only	N/A	mg/l	NA
4,4'-DDE	72559	Yes	Yes	5.7040E-04	mg/l	Human Health Fish Only	N/A	mg/l	NA
4,4'-DDT	50293	Yes	Yes	5.7040E-04	mg/l	Human Health Fish Only	0.0661	mg/l	Acute
Acenaphthene	83329	No	No	1220.8540	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Acrolein	107028	No	No	346.2123	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Acrylonitrile	107131	Yes	No	0.3970	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Aldrin	309002	Yes	No	1.2964E-04	mg/l	Human Health Fish Only	0.1803	mg/l	Acute
alpha-BHC	319846	Yes	No	1.2704E-02	mg/l	Human Health Fish Only	N/A	mg/l	NA
Alpha-Endosulfan	959988	No	No	0.0132	mg/l	Chronic	0.0132	mg/l	Acute
Anthracene	120127	No	No	15124.0128	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Asbestos	1332214	Yes	No	54487478.7234	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Benzene	71432	Yes	No	17.1246	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Benzidine	92875	Yes	No	5.1854E-04	mg/l	Human Health Fish Only	N/A	mg/l	NA
Benzo(a)anthracene	56553	Yes	No	2.9579E-02	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Benzo(a)pyrene	50328	Yes	No	2.9579E-02	mg/l	Human Health Fish & Water	N/A	mg/l	NA

STEADY STATE TOXICS WASTELoad ALLOCATION MODEL (SSTWAM2004) – OUTPUTS – (3.76 MGD)

<u>Parameter</u>	<u>CAS Number</u>	<u>Carcinogen</u>	<u>Bioaccumulative or Persistent</u>	<u>Effluent Limitations</u>				
				<u>Average</u>	<u>Units</u>	<u>Justification</u>	<u>Maximum</u>	<u>Units</u> <u>Justification</u>
Benzo(b)fluoranthene	205992	Yes	No	2.9579E-02	mg/l	Human Health Fish & Water	N/A	mg/l NA
Benzo(k)fluoranthene	205992	Yes	No	2.9579E-02	mg/l	Human Health Fish & Water	N/A	mg/l NA
Beta-BHC	319857	Yes	No	4.4076E-02	mg/l	Human Health Fish Only	N/A	mg/l NA
Beta-Endosulfan	33213659	No	No	0.0132	mg/l	Chronic	0.0132	mg/l Acute
Bis(2-chloroethyl)ether	111444	Yes	No	0.2335	mg/l	Human Health Fish & Water	N/A	mg/l NA
Bis(2-chloroisopropyl)ether	108601	No	No	2551.0383	mg/l	Human Health Fish & Water	N/A	mg/l NA
Bis(2-ethylhexyl)phthalate	117817	Yes	No	5.7040	mg/l	Human Health Fish Only	N/A	mg/l NA
Bis(chloromethyl)ether	542881	Yes	No	0.0008	mg/l	Human Health Fish Only	N/A	mg/l NA
Bromoform	75252	Yes	No	33.4709	mg/l	Human Health Fish & Water	N/A	mg/l NA
Butylbenzyl phthalate	85687	No	No	2733.2553	mg/l	Human Health Fish & Water	N/A	mg/l NA
Carbon Tetrachloride	56235	Yes	No	1.7903	mg/l	Human Health Fish & Water	N/A	mg/l NA
Chlordane	57749	Yes	Yes	2.1001E-03	mg/l	Human Health Fish Only	0.1442	mg/l Acute
Chloride	16887006	No	No	72120.0000	mg/l	Chronic	72120.0000	mg/l Acute
Chlorobenzene	108907	No	No	1239.0757	mg/l	Human Health Fish & Water	N/A	mg/l NA
Chlorodibromomethane	124481	Yes	No	3.1136	mg/l	Human Health Fish & Water	N/A	mg/l NA
Chloroform	67663	Yes	No	44.3684	mg/l	Human Health Fish & Water	N/A	mg/l NA
Chloropyrifos	2921882	No	No	0.0050	mg/l	Chronic	4.9883E-03	mg/l Acute
Chromium (III)	16065831	No	No	72.2064	mg/l	Chronic	185.9267	mg/l Acute
Chromium (VI)	18540299	Yes	No	0.9616	mg/l	Chronic	0.9616	mg/l Acute
Chrysene	218019	Yes	No	2.9579E-02	mg/l	Human Health Fish & Water	N/A	mg/l NA
Color		No	No	136.6628	mg/l	Human Health Fish & Water	N/A	mg/l NA
Demeton	8065483	No	No	0.0607	mg/l	Chronic	N/A	mg/l NA
Dibenzo(a,h)anthracene	53703	Yes	No	2.9579E-02	mg/l	Human Health Fish & Water	N/A	mg/l NA
Dichlorobromomethane	75274	Yes	No	4.2812	mg/l	Human Health Fish & Water	N/A	mg/l NA
Dieldrin	60571	Yes	Yes	1.4001E-04	mg/l	Human Health Fish Only	0.0144	mg/l Acute
Diethyl phthalate	84662	No	No	30976.8936	mg/l	Human Health Fish & Water	N/A	mg/l NA
Dimethyl phthalate	131113	No	No	491985.9574	mg/l	Human Health Fish & Water	N/A	mg/l NA
Di-n-butyl phthalate	84742	No	No	3644.3404	mg/l	Human Health Fish & Water	N/A	mg/l NA
Dinitrophenols	25550587	No	No	125.7297	mg/l	Human Health Fish & Water	N/A	mg/l NA
Endosulfan sulfate	1031078	No	No	112.9746	mg/l	Human Health Fish & Water	N/A	mg/l NA
Endrin	72208	No	No	0.0052	mg/l	Chronic	0.0052	mg/l Acute
Endrin aldehyde	7421934	No	No	0.5284	mg/l	Human Health Fish & Water	N/A	mg/l NA
Ethylbenzene	100414	No	No	5648.7277	mg/l	Human Health Fish & Water	N/A	mg/l NA
Fluoranthene	206440	No	No	236.8821	mg/l	Human Health Fish & Water	N/A	mg/l NA
Fluorene	86737	No	No	2004.3872	mg/l	Human Health Fish & Water	N/A	mg/l NA
Fluoride		No	No	3644.3404	mg/l	Human Health Fish & Water	N/A	mg/l NA
Free Cyanide	57125	No	No	1.3222	mg/l	Chronic	1.3222	mg/l Acute
gamma-BHC (Lindane)	58899	Yes	Yes	5.7095E-02	mg/l	Human Health Fish & Water	0.0571	mg/l Acute
Guthion	86500	No	No	6.0745E-03	mg/l	Chronic	N/A	mg/l NA
Heptachlor	76448	Yes	No	2.0482E-04	mg/l	Human Health Fish Only	0.0313	mg/l Acute
Heptachlor epoxide	1024573	Yes	No	1.0112E-04	mg/l	Human Health Fish Only	0.0313	mg/l Acute
Hexachlorobenzene	118741	Yes	Yes	7.5189E-04	mg/l	Human Health Fish Only	N/A	mg/l NA

STEADY STATE TOXICS WASTELoad ALLOCATION MODEL (SSTWAM2004) – OUTPUTS – (3.76 MGD)

Parameter	CAS Number	Carcinogen	Bioaccumulative or Persistent	Effluent Limitations				
				Average	Units	Justification	Maximum	Units Justification
Hexachlorobutadiene	87683	Yes	Yes	3.4249	mg/l	Human Health Fish & Water	N/A	mg/l NA
Hexachlorocyclo-hexane-Technical	319868	Yes	Yes	9.5742E-02	mg/l	Human Health Fish & Water	N/A	mg/l NA
Hexachlorocyclopentadiene	77474	No	No	437.3209	mg/l	Human Health Fish & Water	N/A	mg/l NA
Hexachloroethane	67721	Yes	No	8.5560	mg/l	Human Health Fish Only	N/A	mg/l NA
Hydrogen Sulfide, Undissociated	7783064	No	No	1.2149	mg/l	Chronic	N/A	mg/l NA
Ideno(1,2,3-cd)pyrene	193395	No	No	6.9242E-03	mg/l	Human Health Fish & Water	N/A	mg/l NA
Isophorone	78591	No	No	63.7760	mg/l	Human Health Fish & Water	N/A	mg/l NA
Malathion	121755	No	No	0.0607	mg/l	Chronic	N/A	mg/l NA
Methoxychlor	72435	No	No	0.0182	mg/l	Chronic	N/A	mg/l NA
Methyl Bromide	74839	No	No	85.6420	mg/l	Human Health Fish & Water	N/A	mg/l NA
Methylene Chloride	75092	Yes	No	35.8061	mg/l	Human Health Fish & Water	N/A	mg/l NA
Mirex	2385855	Yes	Yes	6.0745E-04	mg/l	Chronic	N/A	mg/l NA
Nitrate-Nitrite (as N)	14797558	No	No	18221.7021	mg/l	Human Health Fish & Water	N/A	mg/l NA
Nitrobenzene	98953	No	No	30.9769	mg/l	Human Health Fish & Water	N/A	mg/l NA
Nitrosamines, Other		No	No	1.4577E-03	mg/l	Human Health Fish & Water	N/A	mg/l NA
N-Nitrosodibutylamine	924163	Yes	No	0.0490	mg/l	Human Health Fish & Water	N/A	mg/l NA
N-Nitrosodiethylamine	55185	Yes	No	6.2271E-03	mg/l	Human Health Fish & Water	N/A	mg/l NA
N-Nitrosodimethylamine	62759	Yes	No	5.3709E-03	mg/l	Human Health Fish & Water	N/A	mg/l NA
N-Nitrosodi-n-Propylamine	621647	Yes	No	0.0389	mg/l	Human Health Fish & Water	N/A	mg/l NA
N-Nitrosodiphenylamine	86306	Yes	No	15.5563	mg/l	Human Health Fish Only	N/A	mg/l NA
N-Nitrosopyrrolidine	930552	Yes	No	0.1245	mg/l	Human Health Fish & Water	N/A	mg/l NA
Parathion	56382	Yes	No	3.9065E-03	mg/l	Chronic	0.0039	mg/l Acute
Pentachlorobenzene	608935	Yes	Yes	3.8891	mg/l	Human Health Fish Only	N/A	mg/l NA
Pentachlorophenol	87865	Yes	No	2.1017	mg/l	Human Health Fish & Water	N/A	mg/l NA
Phenol	108952	No	No	38265.5745	mg/l	Human Health Fish & Water	N/A	mg/l NA
Phthalate esters			No	1.8223	mg/l	Chronic	N/A	mg/l NA
Polychlorinated Biphenyls (PCBs)		Yes	Yes	1.6593E-04	mg/l	Human Health Fish Only	N/A	mg/l NA
Pyrene	129000	No	No	1512.4013	mg/l	Human Health Fish & Water	N/A	mg/l NA
Sulfate (as SO4)		No	No	455542.5532	mg/l	Human Health Fish & Water	N/A	mg/l NA
Surfactants		No	No	911.0851	mg/l	Human Health Fish & Water	N/A	mg/l NA
Tetrachloroethylene	127184	Yes	No	5.3709	mg/l	Human Health Fish & Water	N/A	mg/l NA
Toluene	108883	No	No	12390.7574	mg/l	Human Health Fish & Water	N/A	mg/l NA
Total Alpha		No	No	N/A	pCi/l	Human Health Fish & Water	901.5000	pCi/l Acute
Total Ammonia		No	No	1052.7536	mg/l	Chronic	1195.3977	mg/l Acute
Total Beta		No	No	N/A	pCi/l	Human Health Fish & Water	3005.0000	pCi/l Acute
Total Dissolved Solids			No	1366627.6596	mg/l	Human Health Fish & Water	N/A	mg/l NA
Total Radium		No	No	N/A	pCi/l	Human Health Fish & Water	300.5000	pCi/l Acute
Total Strontium-90		No	No	N/A	pCi/l	Human Health Fish & Water	480.8000	pCi/l Acute
Total Recoverable Antimony	7440360	No	No	10.2042	mg/l	Human Health Fish & Water	N/A	mg/l NA
Total Recoverable Arsenic	7440382	Yes	No	0.4229	mg/l	Chronic	20.3741	mg/l Acute
Total Recoverable Barium	7440393	No	No	1822.1702	mg/l	Human Health Fish & Water	N/A	mg/l NA
Total Recoverable Beryllium	7440417	No	No	7.2887	mg/l	Human Health Fish & Water	N/A	mg/l NA

STEADY STATE TOXICS WASTELoad ALLOCATION MODEL (SSTWAM2004) – OUTPUTS – (3.76 MGD)

				<u>Effluent Limitations</u>					
<u>Parameter</u>	<u>CAS Number</u>	<u>Carcinogen</u>	<u>Bioaccumulative or Persistent</u>	<u>Average</u>	<u>Units</u>	<u>Justification</u>	<u>Maximum</u>	<u>Units</u>	<u>Justification</u>
Total Recoverable Cadmium	7440439	No	No	0.2199	mg/l	Chronic	0.2506	mg/l	Acute
Total Recoverable Chromium	7440439	No	No	179.6127	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Total Recoverable Copper	7440508	No	No	1.4467	mg/l	Human Health Fish & Water	1.4467	mg/l	Acute
Total Recoverable Iron	7439896	No	No	N/A	mg/l	Human Health Fish Only	172.3668	mg/l	Acute
Total Recoverable Lead	7439921	No	No	3.1859	mg/l	Chronic	11.3562	mg/l	Acute
Total Recoverable Mercury	7439976	No	Yes	1.0217E-01	mg/l	Human Health Fish Only	0.1022	mg/l	Acute
Total Recoverable Nickel	7440020	No	No	49.1048	mg/l	Human Health Fish & Water	49.1048	mg/l	Acute
Total Recoverable Selenium	7782492	No	No	1.2020	mg/l	Chronic	1.2020	mg/l	Acute
Total Recoverable Silver	7440224	No	No	N/A	mg/l	Human Health Fish & Water	0.7068	mg/l	Acute
Total Recoverable Thallium	7440280	No	No	3.0977	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Total Recoverable Zinc	7440666	No	No	12.2032	mg/l	Human Health Fish & Water	12.2032	mg/l	Acute
Total Residual Chlorine		No	No	1.1419	mg/l	Chronic	1.1419	mg/l	Acute
Toxaphene	8001352	Yes	Yes	1.2149E-04	mg/l	Chronic	0.0439	mg/l	Acute
Trichloroethylene	79016	Yes	No	19.4598	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Tritium		No	No	N/A	pCi/l	Human Health Fish & Water	1202000.0000	pCi/l	Acute
Uranium		No	No	N/A	mg/l	Human Health Fish & Water	1.8030	mg/l	Acute
Vinyl Chloride	75014	Yes	No	15.5679	mg/l	Human Health Fish & Water	N/A	mg/l	NA
<u>Hardness</u>				<u>Chronic</u>		<u>Acute</u>			
Metal limitations are developed using the mixed hardness of the effluent and receiving waters				148.09		193.32			

Toxicity

<u>Type of Test</u>	<u>Maximum</u>	<u>Units</u>	<u>Justification</u>
Acute	18.03	TUa	Acute

STEADY STATE TOXICS WASTeload ALLOCATION MODEL (SSTWAM2004) – REASONABLE POTENTIAL ANALYSIS – (3.76 MGD)

<u>Parameter</u>	<u>CAS Number</u>	<u>Carcinogen</u>	<u>Bioaccumulative or Persistent</u>	<u>Reasonable Potential</u>				
				<u>Average Percentage</u>	<u>Maximum Percentage</u>	<u>Data Source</u>	<u>Average</u>	<u>Maximum</u>
1,1,1-Trichloroethane	71556	No	No	0.00%	0.00%	Application	None	None
1,1,2,2-Tetrachloroethane	79345	Yes	No	0.00%	0.00%	Application	None	None
1,1,2-Trichloroethane	79005	Yes	No	0.00%	0.00%	Application	None	None
1,1-Dichloroethylene	75354	Yes	No	0.00%	0.00%	Application	None	None
1,2,4,5-Tetrachlorobenzene	95943	No	Yes	0.00%	0.00%	Application	None	None
1,2,4-Trichlorobenzene	120821	No	No	0.00%	0.00%	Application	None	None
1,2-Dichlorobenzene	95501	No	No	0.00%	0.00%	Application	None	None
1,2-Dichloroethane	107062	Yes	No	0.00%	0.00%	Application	None	None
1,2-Dichloropropane	78875	Yes	No	0.00%	0.00%	Application	None	None
1,2-Diphenylhydrazine	122667	Yes	No	0.00%	0.00%	Application	None	None
1,2-Trans-Dichloroethylene	156605	Yes	No	0.00%	0.00%	Application	None	None
1,3-Dichlorobenzene	541731	No	No	0.00%	0.00%	Application	None	None
1,3-Dichloropropene	542756	No	No	0.00%	0.00%	Application	None	None
1,4-Dichlorobenzene	106467	No	No	0.00%	0.00%	Application	None	None
2,3,7,8 Tetrachlorodibenzo P Dioxin	1746016	Yes	Yes	0.00%	0.00%	Application	None	None
2,4,5-TP (Silvex)	93721	No	No	0.00%	0.00%	Application	None	None
2,4,5-trichlorophenol	95954	No	No	0.00%	0.00%	Application	None	None
2,4,6-Trichlorophenol	88062	Yes	No	0.00%	0.00%	Application	None	None
2,4-D	94757	Yes	No	0.00%	0.00%	Application	None	None
2,4-Dichlorophenol	120832	No	No	0.00%	0.00%	Application	None	None
2,4-Dimethylphenol	105679	No	No	0.00%	0.00%	Application	None	None
2,4-Dinitrophenol	51285	No	No	0.00%	0.00%	Application	None	None
2,4-Dinitrotoluene	121142	Yes	No	0.00%	0.00%	Application	None	None
2-Chloronaphthalene	91587	No	No	0.00%	0.00%	Application	None	None
2-Chlorophenol	95578	No	No	0.00%	0.00%	Application	None	None
2-methyl-4,6-dinitrophenol	534521	No	No	0.00%	0.00%	Application	None	None
3,3-Dichlorobenzidine	91941	Yes	No	0.00%	0.00%	Application	None	None
4,4'-DDD	72548	Yes	Yes	0.00%	0.00%	Application	None	None
4,4'-DDE	72559	Yes	Yes	0.00%	0.00%	Application	None	None
4,4'-DDT	50293	Yes	Yes	0.00%	0.00%	Application	None	None
Acenaphthene	83329	No	No	0.00%	0.00%	Application	None	None
Acrolein	107028	No	No	0.00%	0.00%	Application	None	None
Acrylonitrile	107131	Yes	No	0.00%	0.00%	Application	None	None
Aldrin	309002	Yes	No	0.00%	0.00%	Application	None	None
alpha-BHC	319846	Yes	No	0.00%	0.00%	Application	None	None
Alpha-Endosulfan	959988	No	No	0.00%	0.00%	Application	None	None
Anthracene	120127	No	No	0.00%	0.00%	Application	None	None
Asbestos	1332214	Yes	No	0.00%	0.00%	Application	None	None
Benzene	71432	Yes	No	0.00%	0.00%	Application	None	None
Benzidine	92875	Yes	No	0.00%	0.00%	Application	None	None
Benzo(a)anthracene	56553	Yes	No	0.00%	0.00%	Application	None	None
Benzo(a)pyrene	50328	Yes	No	0.00%	0.00%	Application	None	None

STEADY STATE TOXICS WASTELOAD ALLOCATION MODEL (SSTWAM2004) – REASONABLE POTENTIAL ANALYSIS – (3.76 MGD)

<u>Parameter</u>	<u>CAS Number</u>	<u>Carcinogen</u>	<u>Bioaccumulative or Persistent</u>	<u>Reasonable Potential</u>				
				<u>Average Percentage</u>	<u>Maximum Percentage</u>	<u>Data Source</u>	<u>Average</u>	<u>Maximum</u>
Benzo(b)fluoranthene	205992	Yes	No	0.00%	0.00%	Application	None	None
Benzo(k)fluoranthene	205992	Yes	No	0.00%	0.00%	Application	None	None
Beta-BHC	319857	Yes	No	0.00%	0.00%	Application	None	None
Beta-Endosulfan	33213659	No	No	0.00%	0.00%	Application	None	None
Bis(2-chloroethyl)ether	111444	Yes	No	0.00%	0.00%	Application	None	None
Bis(2-chloroisopropyl)ether	108601	No	No	0.00%	0.00%	Application	None	None
Bis(2-ethylhexyl)phthalate	117817	Yes	No	0.00%	0.00%	Application	None	None
Bis(chloromethyl)ether	542881	Yes	No	0.00%	0.00%	Application	None	None
Bromoform	75252	Yes	No	0.00%	0.00%	Application	None	None
Butylbenzyl phthalate	85687	No	No	0.00%	0.00%	Application	None	None
Carbon Tetrachloride	56235	Yes	No	0.00%	0.00%	Application	None	None
Chlordane	57749	Yes	Yes	0.00%	0.00%	Application	None	None
Chloride	16887006	No	No	0.00%	0.00%	Application	None	None
Chlorobenzene	108907	No	No	0.00%	0.00%	Application	None	None
Chlorodibromomethane	124481	Yes	No	0.00%	0.00%	Application	None	None
Chloroform	67663	Yes	No	0.00%	0.00%	Application	None	None
Chloropyrifos	2921882	No	No	0.00%	0.00%	Application	None	None
Chromium (III)	16065831	No	No	0.00%	0.00%	Application	None	None
Chromium (VI)	18540299	Yes	No	0.00%	0.00%	Application	None	None
Chrysene	218019	Yes	No	0.00%	0.00%	Application	None	None
Color		No	No	0.00%	0.00%	Application	None	None
Demeton	8065483	No	No	0.00%	0.00%	Application	None	None
Dibenzo(a,h)anthracene	53703	Yes	No	0.00%	0.00%	Application	None	None
Dichlorobromomethane	75274	Yes	No	0.00%	0.00%	Application	None	None
Dieldrin	60571	Yes	Yes	0.00%	0.00%	Application	None	None
Diethyl phthalate	84662	No	No	0.00%	0.00%	Application	None	None
Dimethyl phthalate	131113	No	No	0.00%	0.00%	Application	None	None
Di-n-butyl phthalate	84742	No	No	0.00%	0.00%	Application	None	None
Dinitrophenols	25550587	No	No	0.00%	0.00%	Application	None	None
Endosulfan sulfate	1031078	No	No	0.00%	0.00%	Application	None	None
Endrin	72208	No	No	0.00%	0.00%	Application	None	None
Endrin aldehyde	7421934	No	No	0.00%	0.00%	Application	None	None
Ethylbenzene	100414	No	No	0.00%	0.00%	Application	None	None
Fluoranthene	206440	No	No	0.00%	0.00%	Application	None	None
Fluorene	86737	No	No	0.00%	0.00%	Application	None	None
Fluoride		No	No	0.00%	0.00%	Application	None	None
Free Cyanide	57125	No	No	0.00%	0.00%	Application	None	None
gamma-BHC (Lindane)	58899	Yes	Yes	0.00%	0.00%	Application	None	None
Guthion	86500	No	No	0.00%	0.00%	Application	None	None
Heptachlor	76448	Yes	No	0.00%	0.00%	Application	None	None
Heptachlor epoxide	1024573	Yes	No	0.00%	0.00%	Application	None	None
Hexachlorobenzene	118741	Yes	Yes	0.00%	0.00%	Application	None	None

STEADY STATE TOXICS WASTeload ALLOCATION MODEL (SSTWAM2004) – REASONABLE POTENTIAL ANALYSIS – (3.76 MGD)

Parameter	CAS Number	Carcinogen	Bioaccumulative or Persistent	<u>Reasonable Potential</u>				
				<u>Average Percentage</u>	<u>Maximum Percentage</u>	<u>Data Source</u>	<u>Average</u>	<u>Maximum</u>
Hexachlorobutadiene	87683	Yes	Yes	0.00%	0.00%	Application	None	None
Hexachlorocyclo-hexane-Technical	319868	Yes	Yes	0.00%	0.00%	Application	None	None
Hexachlorocyclopentadiene	77474	No	No	0.00%	0.00%	Application	None	None
Hexachloroethane	67721	Yes	No	0.00%	0.00%	Application	None	None
Hydrogen Sulfide, Undissociated	7783064	No	No	0.00%	0.00%	Application	None	None
Ideno(1,2,3-cd)pyrene	193395	No	No	0.00%	0.00%	Application	None	None
Isophorone	78591	No	No	0.00%	0.00%	Application	None	None
Malathion	121755	No	No	0.00%	0.00%	Application	None	None
Methoxychlor	72435	No	No	0.00%	0.00%	Application	None	None
Methyl Bromide	74839	No	No	0.00%	0.00%	Application	None	None
Methylene Chloride	75092	Yes	No	0.00%	0.00%	Application	None	None
Mirex	2385855	Yes	Yes	0.00%	0.00%	Application	None	None
Nitrate-Nitrite (as N)	14797558	No	No	0.00%	0.00%	Application	None	None
Nitrobenzene	98953	No	No	0.00%	0.00%	Application	None	None
Nitrosamines, Other		No	No	0.00%	0.00%	Application	None	None
N-Nitrosodibutylamine	924163	Yes	No	0.00%	0.00%	Application	None	None
N-Nitrosodiethylamine	55185	Yes	No	0.00%	0.00%	Application	None	None
N-Nitrosodimethylamine	62759	Yes	No	0.00%	0.00%	Application	None	None
N-Nitrosodi-n-Propylamine	621647	Yes	No	0.00%	0.00%	Application	None	None
N-Nitrosodiphenylamine	86306	Yes	No	0.00%	0.00%	Application	None	None
N-Nitrosopyrrolidine	930552	Yes	No	0.00%	0.00%	Application	None	None
Parathion	56382	Yes	No	0.00%	0.00%	Application	None	None
Pentachlorobenzene	608935	Yes	Yes	0.00%	0.00%	Application	None	None
Pentachlorophenol	87865	Yes	No	0.00%	0.00%	Application	None	None
Phenol	108952	No	No	0.00%	0.00%	Application	None	None
Phthalate esters			No	0.00%	0.00%	Application	None	None
Polychlorinated Biphenyls (PCBs)		Yes	Yes	0.00%	0.00%	Application	None	None
Pyrene	129000	No	No	0.00%	0.00%	Application	None	None
Sulfate (as SO4)		No	No	0.00%	0.00%	Application	None	None
Surfactants		No	No	0.00%	0.00%	Application	None	None
Tetrachloroethylene	127184	Yes	No	0.00%	0.00%	Application	None	None
Toluene	108883	No	No	0.00%	0.00%	Application	None	None
Total Alpha		No	No	0.00%	0.00%	Application	None	None
Total Ammonia		No	No	3.66%	4.94%	Application	None	None
Total Beta		No	No	0.00%	0.00%	Application	None	None
Total Dissolved Solids			No	0.00%	0.00%	Application	None	None
Total Radium		No	No	0.00%	0.00%	Application	None	None
Total Strontium-90		No	No	0.00%	0.00%	Application	None	None
Total Recoverable Antimony	7440360	No	No	0.00%	0.00%	Application	None	None
Total Recoverable Arsenic	7440382	Yes	No	0.00%	0.00%	Application	None	None
Total Recoverable Barium	7440393	No	No	0.00%	0.00%	Application	None	None
Total Recoverable Beryllium	7440417	No	No	0.00%	0.00%	Application	None	None

STEADY STATE TOXICS WASTELOAD ALLOCATION MODEL (SSTWAM2004) – REASONABLE POTENTIAL ANALYSIS – (3.76 MGD)

<u>Parameter</u>	<u>CAS Number</u>	<u>Carcinogen</u>	<u>Bioaccumulative or Persistent</u>	<u>Reasonable Potential</u>				
				<u>Average Percentage</u>	<u>Maximum Percentage</u>	<u>Data Source</u>	<u>Average</u>	<u>Maximum</u>
Total Recoverable Cadmium	7440439	No	No	0.00%	0.00%	Application	None	None
Total Recoverable Chromium	7440439	No	No	0.11%	0.00%	Application	None	None
Total Recoverable Copper	7440508	No	No	0.00%	0.00%	Application	None	None
Total Recoverable Iron	7439896	No	No	0.00%	0.00%	Application	None	None
Total Recoverable Lead	7439921	No	No	0.00%	0.00%	Application	None	None
Total Recoverable Mercury	7439976	No	Yes	0.00%	0.00%	Application	None	None
Total Recoverable Nickel	7440020	No	No	0.00%	0.12%	Application	None	None
Total Recoverable Selenium	7782492	No	No	0.00%	0.00%	Application	None	None
Total Recoverable Silver	7440224	No	No	0.00%	0.00%	Application	None	None
Total Recoverable Thallium	7440280	No	No	0.00%	0.00%	Application	None	None
Total Recoverable Zinc	7440666	No	No	0.00%	0.00%	Application	None	None
Total Residual Chlorine		No	No	0.00%	0.00%	Application	None	None
Toxaphene	8001352	Yes	Yes	0.00%	0.00%	Application	None	None
Trichloroethylene	79016	Yes	No	0.00%	0.00%	Application	None	None
Tritium		No	No	0.00%	0.00%	Application	None	None
Uranium		No	No	0.00%	0.00%	Application	None	None
Vinyl Chloride	75014	Yes	No	0.00%	0.00%	Application	None	None

STEADY STATE TOXICS WASTELOAD ALLOCATION MODEL (SSTWAM2004) – INPUTS – 4.5 MGD)

Permit Writer Larry Sowder
 Date Entered 6/8/2006
 Facility Name North American Stainless
 KPDES Number KY0095877
 Outfall Number 001
 Case Number 1 (4.5 MGD)
 Status:
 Is this an existing facility – Enter “E”
 Is this an existing facility with an increase in pollutant load – Enter “I”
 Is this a new facility – Enter “N”
 Is this a regional facility with an approved up-to-date 201 plan – Enter “R”
 Has the permittee made a successful alternatives analysis/socioeconomic demonstration – Enter “A” E

Receiving Water Name Ohio River
 Discharge Mile Point 442.25 (530 USCOE)
 Public Water Supply Name Louisville Water Company
 Intake Water Name Ohio River
 Intake Mile Point 380.8 (600.6 USCOE)
 Total Effluent Flow (Q_T) 4.5 MGD
 Receiving Water 7Q10 (Q_{RW7Q10}) 10600 cfs
 Receiving Water Harmonic Mean (Q_{RWHM}) 45300 cfs
 Receiving Water pH 7.5
 Receiving Water Temperature 28.60 °C
 Intake Water 7Q10 (Q_{IW7Q10}) 10600 cfs
 Intake Water Harmonic Mean (Q_{IWHM}) 45300 cfs
 Effluent Hardness 3049 (as mg/l CaCO₃)
 Receiving Water Hardness 145 (as mg/l CaCO₃)
 Zone of Initial Dilution (ZID) 51.1
 Mixing Zone (MZ) 0.333
 Acute to Chronic Ratio (ACR) 0.1
 Impaired Yes
 Permittee agrees to accept no mixing zone for bioaccumulative or persistent pollutants prior to 09/08/2014 No

Calculation Methodology

Definitions

Acute to Chronic Ratio	ACR	Total Effluent Flow	Q_T
Aquatic Life Acute Criteria	C_A	Receiving Water 7Q10	Q_{RW7Q10}
Aquatic Life Chronic Criteria	C_C	Receiving Water Harmonic Mean	
	Q_{RWHM}		
Human Health Criteria - Fish Only	C_{HHFO}	Intake Water 7Q10	Q_{IW7Q10}
Human Health Criteria - Fish & Water	C_{HHFW}	Intake Water Harmonic Mean	Q_{IWHM}
End of Pipe Effluent Limit	C_T	Zone of Initial Dilution	ZID
Instream Background Concentration	C_U	Mixing Zone	MZ
Toxicity Units - Acute	TU_a	Toxicity Units - Chronic	TU_c
Effluent Hardness	H_T	Receiving Water Hardness	H_{RW}

STEADY STATE TOXICS WASTELOAD ALLOCATION MODEL (SSTWAM2004) – INPUTS – 4.5 MGD)

Aquatic Life - Chemical Specific

Acute

NO ZID given $C_T = C_A$
 ZID given $C_T = (C_A - C_U) \times (ZID)$

Chronic Mixing Zone / Complete Mix

$$C_T = \{C_C[Q_T + (MZ)(Q_{RW7Q10})] - [C_U(MZ)(Q_{RW7Q10})]\} / Q_T$$

Human Health - Chemical Specific

Fish Only: Mixing Zone / Complete Mix

Carcinogen / Non-Carcinogen

$$C_T = \{C_{HHFO}[Q_T + (MZ)(Q_{RWHM})] - C_U(MZ)(Q_{RWHM})\} / Q_T$$

Fish & Water Only: Mixing Zone / Applicable at point of withdrawal

Carcinogen

$$C_T = \{C_{HHFW}[Q_T + (Q_{IWHM})] - C_U(Q_{IWHM})\} / Q_T$$

Non-Carcinogen

$$C_T = \{C_{HHFW}[Q_T + (Q_{IW7Q10})] - C_U(Q_{IW7Q10})\} / Q_T$$

Aquatic Life - Whole Effluent Toxicity

Acute (Units TU_a)

NO ZID given $C_T = C_A$
 ZID given $C_T = (C_A - C_U) \times (ZID)$

Chronic Mixing Zone / Complete Mix (Units TU_c)

$$C_T = \{C_C[Q_T + (MZ)(Q_{RW7Q10})] - [C_U(MZ)(Q_{RW7Q10})]\} / Q_T$$

Conversion of TU_c to TU_a: TU_c x ACR = TU_a

Metal Aquatic Criteria

Pollutant

Acute Criteria

Chronic Criteria

Total Recoverable Cadmium

$$e^{(1.0166 (\ln \text{Hardness}) - 3.924)}$$

$$e^{(0.7409 (\ln \text{Hardness}) - 4.719)}$$

Chromium III

$$e^{(0.8190 (\ln \text{Hardness}) + 3.7256)}$$

$$e^{(0.8190 (\ln \text{Hardness}) + 0.6848)}$$

Total Recoverable Copper

$$e^{(0.9422 (\ln \text{Hardness}) - 1.700)}$$

$$e^{(0.8545 (\ln \text{Hardness}) - 1.702)}$$

Total Recoverable Lead

$$e^{(1.273 (\ln \text{Hardness}) - 1.460)}$$

$$e^{(1.273 (\ln \text{Hardness}) - 4.705)}$$

Total Recoverable Nickel

$$e^{(0.8460 (\ln \text{Hardness}) + 2.255)}$$

$$e^{(0.8460 (\ln \text{Hardness}) + 0.0584)}$$

Total Recoverable Silver

$$e^{(1.72 (\ln \text{Hardness}) - 6.59)}$$

$$e^{(0.8473 (\ln \text{Hardness}) - 0.884)}$$

Total Recoverable Zinc

$$e^{(0.8473 (\ln \text{Hardness}) + 0.884)}$$

$$e^{(0.8473 (\ln \text{Hardness}) + 0.884)}$$

Hardness (as mg/l CaCO₃)

Zone Initial Dilution (ZID)

$$H_{RW} + [H_T + H_{RW}] / ZID$$

Mixing Zone

$$[(Q_{RW7Q10})(MZ)(H_{RW}) + (Q_T)(H_T)] / [(Q_{RW7Q10})(MZ) + (Q_T)]$$

Total Ammonia Criteria

Chronic - applies state wide - unionized criteria of 0.05 mg/l

$$[0.05 * (1 + 10^{(pKa - pH)})] / 1.2$$

$$pKa = (0.0902 + (2730 / (273.1 + T))) \quad T = \text{Temperature } ^\circ\text{C}$$

Acute - applies to the Ohio River (ORSANCO Criteria)

$$[0.411 / (1 + 10^{(7.204 - pH)})] + [58.4 / (1 + 10^{(pH - 7.204)})]$$

Bioaccumulative or Persistent

For new facilities after September 8, 2004 mixing zones shall not be granted for bioaccumulative or persistent pollutants of concern.

Mixing zones for bioaccumulative or persistent pollutants of concerned assigned prior to September 8, 2004 shall expire no later than September 8, 2014, unless the permittee agrees to expiration of the mixing zone prior to that date.

Therefore, the application of the more stringent criteria of Human Health Fish & Water Consumption, Human Health Fish Only Consumption, and Aquatic Life Chronic shall apply as end-of-pipe effluent limitations.

STEADY STATE TOXICS WASTELoad ALLOCATION MODEL (SSTWAM2004) – INPUTS – 4.5 MGD)

Antidegradation

If a new facility or an existing facility that will have a pollutant load increase, the effluent limits are halved unless the receiving stream is impaired or the permittee has demonstrated a negative socioeconomic or cost benefit analysis.

Reasonable Potential Analysis

In establishing water quality based effluent conditions the Division of Water must determine if the pollutant concentrations in the discharge will cause, have the reasonable potential to cause, or contribute to an excursion of any water standard. The process by which the Division of Water makes this determination is known as a Reasonable Potential Analysis.

A Reasonable Potential Analysis is performed by first calculating the expected effluent limitations for those pollutants with water quality criteria. The calculated limits are then compared to the concentrations reported on the KPDES permit application and/or a summarization of the values reported on the Discharge Monitoring Report (DMRs) submitted during the term of the permit. This comparison is made by dividing the reported value by the calculated effluent limitation and converting to a percentage. The following criteria are used in determining how the pollutant will be addressed in the permit.

New Permits or New Pollutants on Permit Renewals

If the reported concentration is less than 70% of the calculated effluent limit then no monitoring or limitations will be required.

If the reported concentration is equal to or greater than 70% but less than 90% of the calculated effluent limit then monitoring will be required.

If the reported concentration is equal to or greater than 90% and the number of analysis reported on the KPDES permit application is less than 12 then monitoring will be required.

If the reported concentration is equal to or greater than 90% and the number of analysis reported on the KPDES permit application is equal or greater than 12 then an effluent limitation will be required.

Permit Renewals - Existing Pollutants

If the reported concentration is less than 70% of the calculated effluent limit then and the source of the reported concentration was the DMRs for that facility and there were more than 12 DMRs utilized to determine the reported concentrations then the pollutant will be removed from the permit.

If the reported concentration is equal to or greater than 70% but less than 90% of the calculated effluent limit then monitoring will be required.

If the reported concentration is equal to or greater than 90% then an effluent limitation will be required.

In all cases, the Division of Water still may exercise its Best Professional Judgment in the implementation of the results.

STEADY STATE TOXICS WASTELOAD ALLOCATION MODEL (SSTWAM2004) – OUTPUTS – (4.5 MGD)

				<u>Effluent Limitations</u>					
<u>Parameter</u>	<u>CAS Number</u>	<u>Carcinogen</u>	<u>Bioaccumulative or Persistent</u>	<u>Average</u>	<u>Units</u>	<u>Justification</u>	<u>Maximum</u>	<u>Units</u>	<u>Justification</u>
1,1,1-Trichloroethane	71556	No	No	304.5378	mg/l	Human Health Fish & Water	N/A	mg/l	NA
1,1,2,2-Tetrachloroethane	79345	Yes	No	1.1057	mg/l	Human Health Fish & Water	N/A	mg/l	NA
1,1,2-Trichloroethane	79005	Yes	No	3.8374	mg/l	Human Health Fish & Water	N/A	mg/l	NA
1,1-Dichloroethylene	75354	Yes	No	0.3707	mg/l	Human Health Fish & Water	N/A	mg/l	NA
1,2,4,5-Tetrachlorobenzene	95943	No	Yes	1.4770	mg/l	Human Health Fish & Water	N/A	mg/l	NA
1,2,4-Trichlorobenzene	120821	No	No	395.8991	mg/l	Human Health Fish & Water	N/A	mg/l	NA
1,2-Dichlorobenzene	95501	No	No	4111.2600	mg/l	Human Health Fish & Water	N/A	mg/l	NA
1,2-Dichloroethane	107062	Yes	No	2.4715	mg/l	Human Health Fish & Water	N/A	mg/l	NA
1,2-Dichloropropane	78875	Yes	No	0.3252	mg/l	Human Health Fish & Water	N/A	mg/l	NA
1,2-Diphenylhydrazine	122667	Yes	No	0.2341	mg/l	Human Health Fish & Water	N/A	mg/l	NA
1,2-Trans-Dichloroethylene	156605	Yes	No	4.553	mg/l	Human Health Fish & Water	N/A	mg/l	NA
1,3-Dichlorobenzene	541731	No	No	487.2604	mg/l	Human Health Fish & Water	N/A	mg/l	NA
1,3-Dichloropropene	542756	No	No	15.2269	mg/l	Human Health Fish & Water	N/A	mg/l	NA
1,4-Dichlorobenzene	106467	No	No	609.0756	mg/l	Human Health Fish & Water	N/A	mg/l	NA
2,3,7,8 Tetrachlorodibenzo P Dioxin	1746016	Yes	Yes	1.1049E-08	mg/l	Human Health Fish Only	N/A	mg/l	NA
2,4,5-TP (Silvex)	93721	No	No	15.2269	mg/l	Human Health Fish & Water	N/A	mg/l	NA
2,4,5-trichlorophenol	95954	No	No	2740.8400	mg/l	Human Health Fish & Water	N/A	mg/l	NA
2,4,6-Trichlorophenol	88062	Yes	No	5.1997	mg/l	Human Health Fish Only	N/A	mg/l	NA
2,4-D	94757	Yes	No	455.2847	mg/l	Human Health Fish & Water	N/A	mg/l	NA
2,4-Dichlorophenol	120832	No	No	117.2470	mg/l	Human Health Fish & Water	N/A	mg/l	NA
2,4-Dimethylphenol	105679	No	No	578.6218	mg/l	Human Health Fish & Water	N/A	mg/l	NA
2,4-Dinitrophenol	51285	No	No	105.0655	mg/l	Human Health Fish & Water	N/A	mg/l	NA
2,4-Dinitrotoluene	121142	Yes	No	0.7154	mg/l	Human Health Fish & Water	N/A	mg/l	NA
2-Chloronaphthalene	91587	No	No	1522.6889	mg/l	Human Health Fish & Water	N/A	mg/l	NA
2-Chlorophenol	95578	No	No	123.3378	mg/l	Human Health Fish & Water	N/A	mg/l	NA
2-methyl-4,6-dinitrophenol	534521	No	No	19.7950	mg/l	Human Health Fish & Water	N/A	mg/l	NA
3,3-Dichlorobenzidine	91941	Yes	No	0.0607	mg/l	Human Health Fish Only	N/A	mg/l	NA
4,4'-DDD	72548	Yes	Yes	6.7162E-04	mg/l	Human Health Fish Only	N/A	mg/l	NA
4,4'-DDE	72559	Yes	Yes	4.7663E-04	mg/l	Human Health Fish Only	N/A	mg/l	NA
4,4'-DDT	50293	Yes	Yes	4.7663E-04	mg/l	Human Health Fish Only	0.0562	mg/l	Acute
Acenaphthene	83329	No	No	1020.2016	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Acrolein	107028	No	No	289.3109	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Acrylonitrile	107131	Yes	No	0.3317	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Aldrin	309002	Yes	No	1.0833E-04	mg/l	Human Health Fish Only	0.1533	mg/l	Acute
alpha-BHC	319846	Yes	No	1.0616E-02	mg/l	Human Health Fish Only	N/A	mg/l	NA
Alpha-Endosulfan	959988	No	No	0.0112	mg/l	Chronic	0.0112	mg/l	Acute
Anthracene	120127	No	No	12638.3178	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Asbestos	1332214	Yes	No	45528466.6667	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Benzene	71432	Yes	No	14.3089	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Benzidine	92875	Yes	No	4.3330E-04	mg/l	Human Health Fish Only	N/A	mg/l	NA
Benzo(a)anthracene	56553	Yes	No	2.4715E-02	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Benzo(a)pyrene	50328	Yes	No	2.4715E-02	mg/l	Human Health Fish & Water	N/A	mg/l	NA

STEADY STATE TOXICS WASTELOAD ALLOCATION MODEL (SSTWAM2004) – OUTPUTS – (4.5 MGD)

Parameter	CAS Number	Carcinogen	Bioaccumulative or Persistent	Effluent Limitations					
				Average	Units	Justification	Maximum	Units	Justification
Benzo(b)fluoranthene	205992	Yes	No	2.4715E-02	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Benzo(k)fluoranthene	205992	Yes	No	2.4715E-02	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Beta-BHC	319857	Yes	No	3.6831E-02	mg/l	Human Health Fish Only	N/A	mg/l	NA
Beta-Endosulfan	33213659	No	No	0.0112	mg/l	Chronic	0.0112	mg/l	Acute
Bis(2-chloroethyl)ether	111444	Yes	No	0.1951	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Bis(2-chloroisopropyl)ether	108601	No	No	2131.7644	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Bis(2-ethylhexyl)phthalate	117817	Yes	No	4.7663	mg/l	Human Health Fish Only	N/A	mg/l	NA
Bis(chloromethyl)ether	542881	Yes	No	0.0006	mg/l	Human Health Fish Only	N/A	mg/l	NA
Bromoform	75252	Yes	No	27.9675	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Butylbenzyl phthalate	85687	No	No	2284.0333	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Carbon Tetrachloride	56235	Yes	No	1.4959	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Chlordane	57749	Yes	Yes	1.7549E-03	mg/l	Human Health Fish Only	0.1226	mg/l	Acute
Chloride	16887006	No	No	61320.0000	mg/l	Chronic	61320.0000	mg/l	Acute
Chlorobenzene	108907	No	No	1035.4284	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Chlorodibromomethane	124481	Yes	No	2.6016	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Chloroform	67663	Yes	No	37.0732	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Chloropyrifos	2921882	No	No	0.0042	mg/l	Chronic	4.2413E-03	mg/l	Acute
Chromium (III)	16065831	No	No	60.5547	mg/l	Chronic	163.7613	mg/l	Acute
Chromium (VI)	18540299	Yes	No	0.8176	mg/l	Chronic	0.8176	mg/l	Acute
Chrysene	218019	Yes	No	2.4715E-02	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Color		No	No	114.2017	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Demeton	8065483	No	No	0.0508	mg/l	Chronic	N/A	mg/l	NA
Dibenzo(a,h)anthracene	53703	Yes	No	2.4715E-02	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Dichlorobromomethane	75274	Yes	No	3.5772	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Dieldrin	60571	Yes	Yes	1.1699E-04	mg/l	Human Health Fish Only	0.0123	mg/l	Acute
Diethyl phthalate	84662	No	No	25885.7111	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Dimethyl phthalate	131113	No	No	411126.0000	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Di-n-butyl phthalate	84742	No	No	3045.3778	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Dinitrophenols	25550587	No	No	105.0655	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Endosulfan sulfate	1031078	No	No	94.4067	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Endrin	72208	No	No	0.0044	mg/l	Chronic	0.0044	mg/l	Acute
Endrin aldehyde	7421934	No	No	0.4416	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Ethylbenzene	100414	No	No	4720.3356	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Fluoranthene	206440	No	No	197.9496	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Fluorene	86737	No	No	1674.9578	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Fluoride		No	No	3045.3778	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Free Cyanide	57125	No	No	1.1242	mg/l	Chronic	1.1242	mg/l	Acute
gamma-BHC (Lindane)	58899	Yes	Yes	4.8545E-02	mg/l	Human Health Fish & Water	0.0485	mg/l	Acute
Guthion	86500	No	No	5.0772E-03	mg/l	Chronic	N/A	mg/l	NA
Heptachlor	76448	Yes	No	1.7116E-04	mg/l	Human Health Fish Only	0.0266	mg/l	Acute
Heptachlor epoxide	1024573	Yes	No	8.4494E-05	mg/l	Human Health Fish Only	0.0266	mg/l	Acute
Hexachlorobenzene	118741	Yes	Yes	6.2829E-04	mg/l	Human Health Fish Only	N/A	mg/l	NA

STEADY STATE TOXICS WASTELOAD ALLOCATION MODEL (SSTWAM2004) – OUTPUTS – (4.5 MGD)

				<u>Effluent Limitations</u>					
			<u>Bioaccumulative</u>						
<u>Parameter</u>	<u>CAS Number</u>	<u>Carcinogen</u>	<u>or Persistent</u>	<u>Average</u>	<u>Units</u>	<u>Justification</u>	<u>Maximum</u>	<u>Units</u>	<u>Justification</u>
Hexachlorobutadiene	87683	Yes	Yes	2.8618	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Hexachlorocyclo-hexane-Technical	319868	Yes	Yes	8.0000E-02	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Hexachlorocyclopentadiene	77474	No	No	365.4453	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Hexachloroethane	67721	Yes	No	7.1495	mg/l	Human Health Fish Only	N/A	mg/l	NA
Hydrogen Sulfide, Undissociated	7783064	No	No	1.0154	mg/l	Chronic	N/A	mg/l	NA
Ideno(1,2,3-cd)pyrene	193395	No	No	5.7862E-03	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Isophorone	78591	No	No	53.2941	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Malathion	121755	No	No	0.0508	mg/l	Chronic	N/A	mg/l	NA
Methoxychlor	72435	No	No	0.0152	mg/l	Chronic	N/A	mg/l	NA
Methyl Bromide	74839	No	No	71.5664	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Methylene Chloride	75092	Yes	No	29.9187	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Mirex	2385855	Yes	Yes	5.0772E-04	mg/l	Chronic	N/A	mg/l	NA
Nitrate-Nitrite (as N)	14797558	No	No	15226.8889	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Nitrobenzene	98953	No	No	25.8857	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Nitrosamines, Other		No	No	1.2182E-03	mg/l	Human Health Fish & Water	N/A	mg/l	NA
N-Nitrosodibutylamine	924163	Yes	No	0.0410	mg/l	Human Health Fish & Water	N/A	mg/l	NA
N-Nitrosodiethylamine	55185	Yes	No	5.2033E-03	mg/l	Human Health Fish & Water	N/A	mg/l	NA
N-Nitrosodimethylamine	62759	Yes	No	4.4878E-03	mg/l	Human Health Fish & Water	N/A	mg/l	NA
N-Nitrosodi-n-Propylamine	621647	Yes	No	0.0325	mg/l	Human Health Fish & Water	N/A	mg/l	NA
N-Nitrosodiphenylamine	86306	Yes	No	12.9991	mg/l	Human Health Fish Only	N/A	mg/l	NA
N-Nitrosopyrrolidine	930552	Yes	No	0.1041	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Parathion	56382	Yes	No	3.3215E-03	mg/l	Chronic	0.0033	mg/l	Acute
Pentachlorobenzene	608935	Yes	Yes	3.2498	mg/l	Human Health Fish Only	N/A	mg/l	NA
Pentachlorophenol	87865	Yes	No	1.7561	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Phenol	108952	No	No	31976.4667	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Phthalate esters			No	1.5232	mg/l	Chronic	N/A	mg/l	NA
Polychlorinated Biphenyls (PCBs)		Yes	Yes	1.3866E-04	mg/l	Human Health Fish Only	N/A	mg/l	NA
Pyrene	129000	No	No	1263.8318	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Sulfate (as SO4)		No	No	380672.2222	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Surfactants		No	No	761.3444	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Tetrachloroethylene	127184	Yes	No	4.4878	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Toluene	108883	No	No	10354.2844	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Total Alpha		No	No	N/A	pCi/l	Human Health Fish & Water	766.5000	pCi/l	Acute
Total Ammonia		No	No	879.9373	mg/l	Chronic	1016.3864	mg/l	Acute
Total Beta		No	No	N/A	pCi/l	Human Health Fish & Water	2555.0000	pCi/l	Acute
Total Dissolved Solids			No	1142016.6667	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Total Radium		No	No	N/A	pCi/l	Human Health Fish & Water	255.5000	pCi/l	Acute
Total Strontium-90		No	No	N/A	pCi/l	Human Health Fish & Water	408.8000	pCi/l	Acute
Total Recoverable Antimony	7440360	No	No	8.5271	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Total Recoverable Arsenic	7440382	Yes	No	0.3780	mg/l	Chronic	17.3231	mg/l	Acute
Total Recoverable Barium	7440393	No	No	1522.6889	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Total Recoverable Beryllium	7440417	No	No	6.0908	mg/l	Human Health Fish & Water	N/A	mg/l	NA

STEADY STATE TOXICS WASTELOAD ALLOCATION MODEL (SSTWAM2004) – OUTPUTS – (4.5 MGD)

				<u>Effluent Limitations</u>					
<u>Parameter</u>	<u>CAS Number</u>	<u>Carcinogen</u>	<u>Bioaccumulative or Persistent</u>	<u>Average</u>	<u>Units</u>	<u>Justification</u>	<u>Maximum</u>	<u>Units</u>	<u>Justification</u>
Total Recoverable Cadmium	7440439	No	No	0.1844	mg/l	Chronic	0.2226	mg/l	Acute
Total Recoverable Chromium	7440439	No	No	150.0929	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Total Recoverable Copper	7440508	No	No	1.2852	mg/l	Human Health Fish & Water	1.2852	mg/l	Acute
Total Recoverable Iron	7439896	No	No	N/A	mg/l	Human Health Fish Only	146.5548	mg/l	Acute
Total Recoverable Lead	7439921	No	No	2.6768	mg/l	Chronic	10.1999	mg/l	Acute
Total Recoverable Mercury	7439976	No	Yes	8.6870E-02	mg/l	Human Health Fish Only	0.0869	mg/l	Acute
Total Recoverable Nickel	7440020	No	No	43.3056	mg/l	Human Health Fish & Water	43.3056	mg/l	Acute
Total Recoverable Selenium	7782492	No	No	1.0220	mg/l	Chronic	1.0220	mg/l	Acute
Total Recoverable Silver	7440224	No	No	N/A	mg/l	Human Health Fish & Water	0.6471	mg/l	Acute
Total Recoverable Thallium	7440280	No	No	2.5886	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Total Recoverable Zinc	7440666	No	No	10.7737	mg/l	Human Health Fish & Water	10.7737	mg/l	Acute
Total Residual Chlorine		No	No	0.9709	mg/l	Chronic	0.9709	mg/l	Acute
Toxaphene	8001352	Yes	Yes	1.0154E-04	mg/l	Chronic	0.0373	mg/l	Acute
Trichloroethylene	79016	Yes	No	16.2602	mg/l	Human Health Fish & Water	N/A	mg/l	NA
Tritium		No	No	N/A	pCi/l	Human Health Fish & Water	1022000.0000	pCi/l	Acute
Uranium		No	No	N/A	mg/l	Human Health Fish & Water	1.5330	mg/l	Acute
Vinyl Chloride	75014	Yes	No	13.0081	mg/l	Human Health Fish & Water	N/A	mg/l	NA
<u>Hardness</u>				<u>Chronic</u>		<u>Acute</u>			
Metal limitations are developed using the mixed hardness of the effluent and receiving waters				148.70		201.83			

Toxicity

<u>Type of Test</u>	<u>Maximum</u>	<u>Units</u>	<u>Justification</u>
Acute	15.33	TUa	Acute

STEADY STATE TOXICS WASTELoad ALLOCATION MODEL (SSTWAM2004) – REASONABLE POTENTIAL ANALYSIS – (4.5 MGD)

<u>Parameter</u>	<u>CAS Number</u>	<u>Carcinogen</u>	<u>Bioaccumulative or Persistent</u>	<u>Reasonable Potential</u>				
				<u>Average Percentage</u>	<u>Maximum Percentage</u>	<u>Data Source</u>	<u>Average</u>	<u>Maximum</u>
1,1,1-Trichloroethane	71556	No	No	0.00%	0.00%	Application	None	None
1,1,2,2-Tetrachloroethane	79345	Yes	No	0.00%	0.00%	Application	None	None
1,1,2-Trichloroethane	79005	Yes	No	0.00%	0.00%	Application	None	None
1,1-Dichloroethylene	75354	Yes	No	0.00%	0.00%	Application	None	None
1,2,4,5-Tetrachlorobenzene	95943	No	Yes	0.00%	0.00%	Application	None	None
1,2,4-Trichlorobenzene	120821	No	No	0.00%	0.00%	Application	None	None
1,2-Dichlorobenzene	95501	No	No	0.00%	0.00%	Application	None	None
1,2-Dichloroethane	107062	Yes	No	0.00%	0.00%	Application	None	None
1,2-Dichloropropane	78875	Yes	No	0.00%	0.00%	Application	None	None
1,2-Diphenylhydrazine	122667	Yes	No	0.00%	0.00%	Application	None	None
1,2-Trans-Dichloroethylene	156605	Yes	No	0.00%	0.00%	Application	None	None
1,3-Dichlorobenzene	541731	No	No	0.00%	0.00%	Application	None	None
1,3-Dichloropropene	542756	No	No	0.00%	0.00%	Application	None	None
1,4-Dichlorobenzene	106467	No	No	0.00%	0.00%	Application	None	None
2,3,7,8 Tetrachlorodibenzo P Dioxin	1746016	Yes	Yes	0.00%	0.00%	Application	None	None
2,4,5-TP (Silvex)	93721	No	No	0.00%	0.00%	Application	None	None
2,4,5-trichlorophenol	95954	No	No	0.00%	0.00%	Application	None	None
2,4,6-Trichlorophenol	88062	Yes	No	0.00%	0.00%	Application	None	None
2,4-D	94757	Yes	No	0.00%	0.00%	Application	None	None
2,4-Dichlorophenol	120832	No	No	0.00%	0.00%	Application	None	None
2,4-Dimethylphenol	105679	No	No	0.00%	0.00%	Application	None	None
2,4-Dinitrophenol	51285	No	No	0.00%	0.00%	Application	None	None
2,4-Dinitrotoluene	121142	Yes	No	0.00%	0.00%	Application	None	None
2-Chloronaphthalene	91587	No	No	0.00%	0.00%	Application	None	None
2-Chlorophenol	95578	No	No	0.00%	0.00%	Application	None	None
2-methyl-4,6-dinitrophenol	534521	No	No	0.00%	0.00%	Application	None	None
3,3-Dichlorobenzidine	91941	Yes	No	0.00%	0.00%	Application	None	None
4,4'-DDD	72548	Yes	Yes	0.00%	0.00%	Application	None	None
4,4'-DDE	72559	Yes	Yes	0.00%	0.00%	Application	None	None
4,4'-DDT	50293	Yes	Yes	0.00%	0.00%	Application	None	None
Acenaphthene	83329	No	No	0.00%	0.00%	Application	None	None
Acrolein	107028	No	No	0.00%	0.00%	Application	None	None
Acrylonitrile	107131	Yes	No	0.00%	0.00%	Application	None	None
Aldrin	309002	Yes	No	0.00%	0.00%	Application	None	None
alpha-BHC	319846	Yes	No	0.00%	0.00%	Application	None	None
Alpha-Endosulfan	959988	No	No	0.00%	0.00%	Application	None	None
Anthracene	120127	No	No	0.00%	0.00%	Application	None	None
Asbestos	1332214	Yes	No	0.00%	0.00%	Application	None	None
Benzene	71432	Yes	No	0.00%	0.00%	Application	None	None
Benzidine	92875	Yes	No	0.00%	0.00%	Application	None	None
Benzo(a)anthracene	56553	Yes	No	0.00%	0.00%	Application	None	None
Benzo(a)pyrene	50328	Yes	No	0.00%	0.00%	Application	None	None

STEADY STATE TOXICS WASTELoad ALLOCATION MODEL (SSTWAM2004) – REASONABLE POTENTIAL ANALYSIS – (4.5 MGD)

<u>Parameter</u>	<u>CAS Number</u>	<u>Carcinogen</u>	<u>Bioaccumulative or Persistent</u>	<u>Reasonable Potential</u>				
				<u>Average Percentage</u>	<u>Maximum Percentage</u>	<u>Data Source</u>	<u>Average</u>	<u>Maximum</u>
Benzo(b)fluoranthene	205992	Yes	No	0.00%	0.00%	Application	None	None
Benzo(k)fluoranthene	205992	Yes	No	0.00%	0.00%	Application	None	None
Beta-BHC	319857	Yes	No	0.00%	0.00%	Application	None	None
Beta-Endosulfan	33213659	No	No	0.00%	0.00%	Application	None	None
Bis(2-chloroethyl)ether	111444	Yes	No	0.00%	0.00%	Application	None	None
Bis(2-chloroisopropyl)ether	108601	No	No	0.00%	0.00%	Application	None	None
Bis(2-ethylhexyl)phthalate	117817	Yes	No	0.00%	0.00%	Application	None	None
Bis(chloromethyl)ether	542881	Yes	No	0.00%	0.00%	Application	None	None
Bromoform	75252	Yes	No	0.00%	0.00%	Application	None	None
Butylbenzyl phthalate	85687	No	No	0.00%	0.00%	Application	None	None
Carbon Tetrachloride	56235	Yes	No	0.00%	0.00%	Application	None	None
Chlordane	57749	Yes	Yes	0.00%	0.00%	Application	None	None
Chloride	16887006	No	No	0.00%	0.00%	Application	None	None
Chlorobenzene	108907	No	No	0.00%	0.00%	Application	None	None
Chlorodibromomethane	124481	Yes	No	0.00%	0.00%	Application	None	None
Chloroform	67663	Yes	No	0.00%	0.00%	Application	None	None
Chloropyrifos	2921882	No	No	0.00%	0.00%	Application	None	None
Chromium (III)	16065831	No	No	0.00%	0.00%	Application	None	None
Chromium (VI)	18540299	Yes	No	0.00%	0.00%	Application	None	None
Chrysene	218019	Yes	No	0.00%	0.00%	Application	None	None
Color		No	No	0.00%	0.00%	Application	None	None
Demeton	8065483	No	No	0.00%	0.00%	Application	None	None
Dibenzo(a,h)anthracene	53703	Yes	No	0.00%	0.00%	Application	None	None
Dichlorobromomethane	75274	Yes	No	0.00%	0.00%	Application	None	None
Dieldrin	60571	Yes	Yes	0.00%	0.00%	Application	None	None
Diethyl phthalate	84662	No	No	0.00%	0.00%	Application	None	None
Dimethyl phthalate	131113	No	No	0.00%	0.00%	Application	None	None
Di-n-butyl phthalate	84742	No	No	0.00%	0.00%	Application	None	None
Dinitrophenols	25550587	No	No	0.00%	0.00%	Application	None	None
Endosulfan sulfate	1031078	No	No	0.00%	0.00%	Application	None	None
Endrin	72208	No	No	0.00%	0.00%	Application	None	None
Endrin aldehyde	7421934	No	No	0.00%	0.00%	Application	None	None
Ethylbenzene	100414	No	No	0.00%	0.00%	Application	None	None
Fluoranthene	206440	No	No	0.00%	0.00%	Application	None	None
Fluorene	86737	No	No	0.00%	0.00%	Application	None	None
Fluoride		No	No	0.00%	0.00%	Application	None	None
Free Cyanide	57125	No	No	0.00%	0.00%	Application	None	None
gamma-BHC (Lindane)	58899	Yes	Yes	0.00%	0.00%	Application	None	None
Guthion	86500	No	No	0.00%	0.00%	Application	None	None
Heptachlor	76448	Yes	No	0.00%	0.00%	Application	None	None
Heptachlor epoxide	1024573	Yes	No	0.00%	0.00%	Application	None	None
Hexachlorobenzene	118741	Yes	Yes	0.00%	0.00%	Application	None	None

STEADY STATE TOXICS WASTELoad ALLOCATION MODEL (SSTWAM2004) – REASONABLE POTENTIAL ANALYSIS – (4.5 MGD)

<u>Parameter</u>	<u>CAS Number</u>	<u>Carcinogen</u>	<u>Bioaccumulative or Persistent</u>	<u>Reasonable Potential</u>				
				<u>Average Percentage</u>	<u>Maximum Percentage</u>	<u>Data Source</u>	<u>Average</u>	<u>Maximum</u>
Hexachlorobutadiene	87683	Yes	Yes	0.00%	0.00%	Application	None	None
Hexachlorocyclo-hexane-Technical	319868	Yes	Yes	0.00%	0.00%	Application	None	None
Hexachlorocyclopentadiene	77474	No	No	0.00%	0.00%	Application	None	None
Hexachloroethane	67721	Yes	No	0.00%	0.00%	Application	None	None
Hydrogen Sulfide, Undissociated	7783064	No	No	0.00%	0.00%	Application	None	None
Ideno(1,2,3-cd)pyrene	193395	No	No	0.00%	0.00%	Application	None	None
Isophorone	78591	No	No	0.00%	0.00%	Application	None	None
Malathion	121755	No	No	0.00%	0.00%	Application	None	None
Methoxychlor	72435	No	No	0.00%	0.00%	Application	None	None
Methyl Bromide	74839	No	No	0.00%	0.00%	Application	None	None
Methylene Chloride	75092	Yes	No	0.00%	0.00%	Application	None	None
Mirex	2385855	Yes	Yes	0.00%	0.00%	Application	None	None
Nitrate-Nitrite (as N)	14797558	No	No	0.00%	0.00%	Application	None	None
Nitrobenzene	98953	No	No	0.00%	0.00%	Application	None	None
Nitrosamines, Other		No	No	0.00%	0.00%	Application	None	None
N-Nitrosodibutylamine	924163	Yes	No	0.00%	0.00%	Application	None	None
N-Nitrosodiethylamine	55185	Yes	No	0.00%	0.00%	Application	None	None
N-Nitrosodimethylamine	62759	Yes	No	0.00%	0.00%	Application	None	None
N-Nitrosodi-n-Propylamine	621647	Yes	No	0.00%	0.00%	Application	None	None
N-Nitrosodiphenylamine	86306	Yes	No	0.00%	0.00%	Application	None	None
N-Nitrosopyrrolidine	930552	Yes	No	0.00%	0.00%	Application	None	None
Parathion	56382	Yes	No	0.00%	0.00%	Application	None	None
Pentachlorobenzene	608935	Yes	Yes	0.00%	0.00%	Application	None	None
Pentachlorophenol	87865	Yes	No	0.00%	0.00%	Application	None	None
Phenol	108952	No	No	0.00%	0.00%	Application	None	None
Phthalate esters			No	0.00%	0.00%	Application	None	None
Polychlorinated Biphenyls (PCBs)		Yes	Yes	0.00%	0.00%	Application	None	None
Pyrene	129000	No	No	0.00%	0.00%	Application	None	None
Sulfate (as SO4)		No	No	0.00%	0.00%	Application	None	None
Surfactants		No	No	0.00%	0.00%	Application	None	None
Tetrachloroethylene	127184	Yes	No	0.00%	0.00%	Application	None	None
Toluene	108883	No	No	0.00%	0.00%	Application	None	None
Total Alpha		No	No	0.00%	0.00%	Application	None	None
Total Ammonia		No	No	4.38%	5.80%	Application	None	None
Total Beta		No	No	0.00%	0.00%	Application	None	None
Total Dissolved Solids			No	0.00%	0.00%	Application	None	None
Total Radium		No	No	0.00%	0.00%	Application	None	None
Total Strontium-90		No	No	0.00%	0.00%	Application	None	None
Total Recoverable Antimony	7440360	No	No	0.00%	0.00%	Application	None	None
Total Recoverable Arsenic	7440382	Yes	No	0.00%	0.00%	Application	None	None
Total Recoverable Barium	7440393	No	No	0.00%	0.00%	Application	None	None
Total Recoverable Beryllium	7440417	No	No	0.00%	0.00%	Application	None	None

STEADY STATE TOXICS WASTELOAD ALLOCATION MODEL (SSTWAM2004) – REASONABLE POTENTIAL ANALYSIS – (4.5 MGD)

<u>Parameter</u>	<u>CAS Number</u>	<u>Carcinogen</u>	<u>Bioaccumulative or Persistent</u>	<u>Reasonable Potential</u>				
				<u>Average Percentage</u>	<u>Maximum Percentage</u>	<u>Data Source</u>	<u>Average</u>	<u>Maximum</u>
Total Recoverable Cadmium	7440439	No	No	0.00%	0.00%	Application	None	None
Total Recoverable Chromium	7440439	No	No	0.13%	0.00%	Application	None	None
Total Recoverable Copper	7440508	No	No	0.00%	0.00%	Application	None	None
Total Recoverable Iron	7439896	No	No	0.00%	0.00%	Application	None	None
Total Recoverable Lead	7439921	No	No	0.00%	0.00%	Application	None	None
Total Recoverable Mercury	7439976	No	Yes	0.00%	0.00%	Application	None	None
Total Recoverable Nickel	7440020	No	No	0.00%	0.14%	Application	None	None
Total Recoverable Selenium	7782492	No	No	0.00%	0.00%	Application	None	None
Total Recoverable Silver	7440224	No	No	0.00%	0.00%	Application	None	None
Total Recoverable Thallium	7440280	No	No	0.00%	0.00%	Application	None	None
Total Recoverable Zinc	7440666	No	No	0.00%	0.00%	Application	None	None
Total Residual Chlorine		No	No	0.00%	0.00%	Application	None	None
Toxaphene	8001352	Yes	Yes	0.00%	0.00%	Application	None	None
Trichloroethylene	79016	Yes	No	0.00%	0.00%	Application	None	None
Tritium		No	No	0.00%	0.00%	Application	None	None
Uranium		No	No	0.00%	0.00%	Application	None	None
Vinyl Chloride	75014	Yes	No	0.00%	0.00%	Application	None	None

CORMIX2 PREDICTION FILE: Thermal Discharge

XX

CORMIX MIXING ZONE EXPERT SYSTEM
Subsystem CORMIX2: Multiport Diffuser Discharges
CORMIX Version 5.0GT
HYDRO2 Version 5.0.0.0 March 2007

CASE DESCRIPTION

Site name/label: North American Stainless
Design case: Major Modification - Temperature Mixing Zone
FILE NAME: C:\...IX 5.0_TEST\MyFiles\NAS Major Mod Temperature.prd
Time stamp: Tue Jan 27 13:36:35 2009

ENVIRONMENT PARAMETERS (metric units)

Bounded section
BS = 560.00 AS = 1545.60 QA = 300.16 ICHREG= 1
HA = 2.76 HD = 2.13
UA = 0.194 F = 0.050 USTAR = 0.1541E-01
UW = 2.000 UWSTAR=0.2198E-02
Uniform density environment
STRCND= U RHOAM = 997.0456

DIFFUSER DISCHARGE PARAMETERS (metric units)

Diffuser type: DITYPE= unidirectional_perpendicular
BANK = LEFT DISTB = 60.99 YB1 = 49.56 YB2 = 72.43
LD = 22.88 NOPEN = 3 SPAC = 11.44
D0 = 0.250 A0 = 0.049 H0 = 0.10 SUB0 = 2.03
Nozzle/port arrangement: unidirectional_without_fanning
GAMMA = 90.00 THETA = 15.00 SIGMA = 0.00 BETA = 90.00
U0 = 1.339 Q0 = 0.197 = 0.1972E+00
RHO0 = 999.4040 DRHO0 = -.2358E+01 GP0 = -.2320E-01
C0 = 0.1280E+02 CUNITS= deg.C
IPOLL = 3 KS = 0.0000E+00 KD = 0.0000E+00

FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)

q0 = 0.8617E-02 m0 = 0.1154E-01 j0 = -.1999E-03 SIGNJ0= -1.0
Associated 2-d length scales (meters)
lQ=B = 0.006 lM = 3.37 lm = 0.31
lmp = 99999.00 lbp = 99999.00 la = 99999.00

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)

Q0 = 0.1972E+00 M0 = 0.2640E+00 J0 = -.4573E-02
Associated 3-d length scales (meters)
LQ = 0.22 LM = 5.45 Lm = 2.65 Lb = 0.62
Lmp = 99999.00 Lbp = 99999.00

NON-DIMENSIONAL PARAMETERS

FR0 = 109.57 FRD0 = 17.58 R = 6.89 PL = 140.
(slot) (port/nozzle)

RECOMPUTED SOURCE CONDITIONS FOR RISER GROUPS:

Properties of riser group with 1 ports/nozzles each:
U0 = 1.339 D0 = 0.250 A0 = 0.049 THETA = 15.00
FR0 = 109.57 FRD0 = 17.58 R = 6.89
(slot) (riser group)

CORMIX2 PREDICTION FILE: Thermal Discharge

[illegible]

FLOW CLASSIFICATION

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22222222222222222222222222222222222222222222222222222222
2  Flow class (CORMIX2)          =      MNU7  2
2  Applicable layer depth HS =      2.13  2
2222222222222222222222222222222222222222222222222222222

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MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS

```

C0      =0.1280E+02  CUNITS=  deg.C
NTOX   =  0
NSTD   =  1          CSTD  =0.6700E+01
REGMZ  =  1
REGSPC=  1          XREG   =    187.00  WREG   =    0.00  AREG   =    0.00
XINT   =  5600.00  XMAX   =    5600.00

```

X-Y-Z COORDINATE SYSTEM:

ORIGIN is located at the bottom and the diffuser mid-point:
60.99 m from the LEFT bank/shore.

X-axis points downstream, Y-axis points to left, Z-axis points upward.

```
NSTEP = 100 display intervals per module
```

NOTE on dilution/concentration values for this HEATED DISCHARGE (IPOLL=3):

S = hydrodynamic dilutions, include buoyancy (heat) loss effects, but provided plume has surface contact

C = corresponding temperature values (always in "degC!"), include heat loss, if any

BEGIN MOD201: DIFFUSER DISCHARGE MODULE

Due to complex near-field motions: EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

Profile definitions:

BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
BH = top-hat half-width, in horizontal plane normal to trajectory
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)

X	Y	Z	S	C	BV	BH
0.00	0.00	0.10	1.0	0.128E+02	0.01	11.44

END OF MOD201: DIFFUSER DISCHARGE MODULE

BEGIN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

In this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY MIXED over the entire layer depth (HS = 2.13m). Full mixing is achieved after a plume distance of about five layer depths from the diffuser.

CORMIX2 PREDICTION FILE: Thermal Discharge

XX

Profile definitions:

- BV = layer depth (vertically mixed)
- BH = top-hat half-width, in horizontal plane normal to trajectory
- S = hydrodynamic average (bulk) dilution
- C = average (bulk) concentration (includes reaction effects, if any)

X	Y	Z	S	C	BV	BH
0.00	0.00	0.10	1.0	0.128E+02	0.01	11.44

**** WATER QUALITY STANDARD OR CCC HAS BEEN FOUND ****
 The pollutant concentration in the plume falls below water quality standard or CCC value of 0.670E+01 in the current prediction interval.
 This is the spatial extent of concentrations exceeding the water quality standard or CCC value.

0.11	0.00	0.11	6.0	0.213E+01	0.03	11.42
0.23	0.00	0.12	8.1	0.158E+01	0.05	11.40
0.34	0.00	0.13	9.7	0.132E+01	0.07	11.38
0.46	0.00	0.14	11.0	0.116E+01	0.10	11.36
0.57	0.00	0.15	12.2	0.105E+01	0.12	11.35
0.69	0.00	0.16	13.3	0.964E+00	0.14	11.33
0.80	0.00	0.17	14.3	0.897E+00	0.17	11.31
0.92	0.00	0.18	15.2	0.843E+00	0.19	11.29
1.03	0.00	0.19	16.0	0.798E+00	0.21	11.28
1.14	0.00	0.20	16.9	0.760E+00	0.23	11.26
1.26	0.00	0.21	17.6	0.726E+00	0.26	11.25
1.37	0.00	0.22	18.4	0.697E+00	0.28	11.23
1.49	0.00	0.23	19.1	0.671E+00	0.30	11.22
1.60	0.00	0.24	19.8	0.648E+00	0.33	11.21
1.72	0.00	0.24	20.4	0.627E+00	0.35	11.19
1.83	0.00	0.25	21.1	0.608E+00	0.37	11.18
1.94	0.00	0.26	21.7	0.591E+00	0.39	11.17
2.06	0.00	0.27	22.3	0.575E+00	0.42	11.16
2.17	0.00	0.28	22.9	0.560E+00	0.44	11.14
2.29	0.00	0.29	23.4	0.547E+00	0.46	11.13
2.40	0.00	0.30	24.0	0.534E+00	0.49	11.12
2.52	0.00	0.31	24.5	0.522E+00	0.51	11.11
2.63	0.00	0.32	25.0	0.511E+00	0.53	11.10
2.75	0.00	0.33	25.6	0.501E+00	0.55	11.09
2.86	0.00	0.34	26.1	0.491E+00	0.58	11.08
2.97	0.00	0.35	26.6	0.482E+00	0.60	11.07
3.09	0.00	0.36	27.0	0.473E+00	0.62	11.06
3.20	0.00	0.37	27.5	0.465E+00	0.65	11.05
3.32	0.00	0.38	28.0	0.457E+00	0.67	11.04
3.43	0.00	0.39	28.5	0.450E+00	0.69	11.03
3.55	0.00	0.40	28.9	0.443E+00	0.71	11.02
3.66	0.00	0.41	29.4	0.436E+00	0.74	11.01
3.78	0.00	0.42	29.8	0.430E+00	0.76	11.00
3.89	0.00	0.43	30.2	0.423E+00	0.78	11.00
4.00	0.00	0.44	30.7	0.418E+00	0.81	10.99
4.12	0.00	0.45	31.1	0.412E+00	0.83	10.98
4.23	0.00	0.46	31.5	0.406E+00	0.85	10.97
4.35	0.00	0.47	31.9	0.401E+00	0.87	10.96
4.46	0.00	0.48	32.3	0.396E+00	0.90	10.96
4.58	0.00	0.49	32.7	0.391E+00	0.92	10.95
4.69	0.00	0.50	33.1	0.387E+00	0.94	10.94
4.80	0.00	0.51	33.5	0.382E+00	0.97	10.94
4.92	0.00	0.51	33.9	0.378E+00	0.99	10.93

CORMIX2 PREDICTION FILE: Thermal Discharge

XX						
5.03	0.00	0.52	34.3	0.374E+00	1.01	10.92
5.15	0.00	0.53	34.6	0.370E+00	1.03	10.92
5.26	0.00	0.54	35.0	0.366E+00	1.06	10.91
5.38	0.00	0.55	35.4	0.362E+00	1.08	10.90
5.49	0.00	0.56	35.7	0.358E+00	1.10	10.90
5.61	0.00	0.57	36.1	0.355E+00	1.13	10.89
5.72	0.00	0.58	36.4	0.351E+00	1.15	10.89
5.83	0.00	0.59	36.8	0.348E+00	1.17	10.88
5.95	0.00	0.60	37.1	0.345E+00	1.19	10.88
6.06	0.00	0.61	37.5	0.341E+00	1.22	10.87
6.18	0.00	0.62	37.8	0.338E+00	1.24	10.86
6.29	0.00	0.63	38.2	0.335E+00	1.26	10.86
6.41	0.00	0.64	38.5	0.332E+00	1.29	10.85
6.52	0.00	0.65	38.8	0.329E+00	1.31	10.85
6.64	0.00	0.66	39.2	0.327E+00	1.33	10.85
6.75	0.00	0.67	39.5	0.324E+00	1.36	10.84
6.86	0.00	0.68	39.8	0.321E+00	1.38	10.84
6.98	0.00	0.69	40.2	0.319E+00	1.40	10.83
7.09	0.00	0.70	40.5	0.316E+00	1.42	10.83
7.21	0.00	0.71	40.8	0.314E+00	1.45	10.82
7.32	0.00	0.72	41.1	0.311E+00	1.47	10.82
7.44	0.00	0.73	41.4	0.309E+00	1.49	10.82
7.55	0.00	0.74	41.7	0.307E+00	1.52	10.81
7.66	0.00	0.75	42.0	0.305E+00	1.54	10.81
7.78	0.00	0.76	42.3	0.302E+00	1.56	10.81
7.89	0.00	0.77	42.6	0.300E+00	1.58	10.80
8.01	0.00	0.78	42.9	0.298E+00	1.61	10.80
8.12	0.00	0.79	43.2	0.296E+00	1.63	10.80
8.24	0.00	0.79	43.5	0.294E+00	1.65	10.80
8.35	0.00	0.80	43.8	0.292E+00	1.68	10.79
8.47	0.00	0.81	44.1	0.290E+00	1.70	10.79
8.58	0.00	0.82	44.4	0.288E+00	1.72	10.79
8.69	0.00	0.83	44.7	0.286E+00	1.74	10.79
8.81	0.00	0.84	45.0	0.285E+00	1.77	10.78
8.92	0.00	0.85	45.3	0.283E+00	1.79	10.78
9.04	0.00	0.86	45.6	0.281E+00	1.81	10.78
9.15	0.00	0.87	45.8	0.279E+00	1.84	10.78
9.27	0.00	0.88	46.1	0.278E+00	1.86	10.78
9.38	0.00	0.89	46.4	0.276E+00	1.88	10.78
9.50	0.00	0.90	46.7	0.274E+00	1.90	10.77
9.61	0.00	0.91	46.9	0.273E+00	1.93	10.77
9.72	0.00	0.92	47.2	0.271E+00	1.95	10.77
9.84	0.00	0.93	47.5	0.270E+00	1.97	10.77
9.95	0.00	0.94	47.8	0.268E+00	2.00	10.77
10.07	0.00	0.95	48.0	0.267E+00	2.02	10.77
10.18	0.00	0.96	48.3	0.265E+00	2.04	10.77
10.30	0.00	0.97	48.6	0.264E+00	2.06	10.77
10.41	0.00	0.98	48.8	0.262E+00	2.09	10.77
10.52	0.00	0.99	49.1	0.261E+00	2.11	10.77
10.64	0.00	1.00	49.3	0.259E+00	2.13	10.76
10.75	0.00	1.01	49.6	0.258E+00	2.13	10.76
10.87	0.00	1.02	49.9	0.257E+00	2.13	10.76
10.98	0.00	1.03	50.1	0.255E+00	2.13	10.76
11.10	0.00	1.04	50.4	0.254E+00	2.13	10.76
11.21	0.00	1.05	50.6	0.253E+00	2.13	10.76
11.33	0.00	1.06	50.9	0.252E+00	2.13	10.76

CORMIX2 PREDICTION FILE: Thermal Discharge

XX

11.44 0.00 1.06 51.1 0.250E+00 2.13 10.76
 Cumulative travel time = 51.9086 sec
 Plume centerline may exhibit slight discontinuities in transition
 to subsequent far-field module.

END OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

BEGIN MOD251: DIFFUSER PLUME IN CO-FLOW

Phase 1: Vertically mixed, Phase 2: Re-stratified

Phase 2: The flow has RESTRATIFIED at the beginning of this zone.

This flow region is INSIGNIFICANT in spatial extent and will be by-passed.

END OF MOD251: DIFFUSER PLUME IN CO-FLOW

** End of NEAR-FIELD REGION (NFR) **

The initial plume WIDTH values in the next far-field module will be
 CORRECTED by a factor 1.13 to conserve the mass flux in the far-field!

BEGIN MOD241: BUOYANT AMBIENT SPREADING

Profile definitions:

BV = top-hat thickness, measured vertically
 BH = top-hat half-width, measured horizontally in y-direction
 ZU = upper plume boundary (Z-coordinate)
 ZL = lower plume boundary (Z-coordinate)
 S = hydrodynamic average (bulk) dilution
 C = average (bulk) concentration (includes reaction effects, if any)

Plume Stage 1 (not bank attached):

X	Y	Z	S	C	BV	BH	ZU	ZL
11.44	0.00	0.00	51.1	0.250E+00	2.13	12.18	2.13	0.00
12.70	0.00	0.00	51.4	0.249E+00	2.12	12.31	2.12	0.00
13.96	0.00	0.00	51.7	0.248E+00	2.11	12.44	2.11	0.00
15.22	0.00	0.00	52.0	0.246E+00	2.10	12.56	2.10	0.00
16.49	0.00	0.00	52.2	0.245E+00	2.09	12.69	2.09	0.00
17.75	0.00	0.00	52.5	0.244E+00	2.08	12.82	2.08	0.00
19.01	0.00	0.00	52.8	0.242E+00	2.07	12.94	2.07	0.00
20.27	0.00	0.00	53.1	0.241E+00	2.06	13.07	2.06	0.00
21.53	0.00	0.00	53.4	0.240E+00	2.05	13.19	2.05	0.00
22.79	0.00	0.00	53.7	0.239E+00	2.04	13.32	2.04	0.00
24.05	0.00	0.00	53.9	0.237E+00	2.04	13.44	2.04	0.00
25.31	0.00	0.00	54.2	0.236E+00	2.03	13.56	2.03	0.00
26.58	0.00	0.00	54.5	0.235E+00	2.02	13.68	2.02	0.00
27.84	0.00	0.00	54.8	0.234E+00	2.01	13.81	2.01	0.00
29.10	0.00	0.00	55.1	0.232E+00	2.01	13.93	2.01	0.00
30.36	0.00	0.00	55.4	0.231E+00	2.00	14.05	2.00	0.00
31.62	0.00	0.00	55.7	0.230E+00	2.00	14.16	2.00	0.00
32.88	0.00	0.00	56.0	0.229E+00	1.99	14.28	1.99	0.00
34.14	0.00	0.00	56.3	0.227E+00	1.98	14.40	1.98	0.00
35.40	0.00	0.00	56.6	0.226E+00	1.98	14.52	1.98	0.00

CORMIX2 PREDICTION FILE: Thermal Discharge

XX								
36.67	0.00	0.00	56.9	0.225E+00	1.97	14.63	1.97	0.00
37.93	0.00	0.00	57.2	0.224E+00	1.97	14.75	1.97	0.00
39.19	0.00	0.00	57.6	0.222E+00	1.96	14.87	1.96	0.00
40.45	0.00	0.00	57.9	0.221E+00	1.96	14.98	1.96	0.00
41.71	0.00	0.00	58.2	0.220E+00	1.96	15.09	1.96	0.00
42.97	0.00	0.00	58.5	0.219E+00	1.95	15.21	1.95	0.00
44.23	0.00	0.00	58.8	0.218E+00	1.95	15.32	1.95	0.00
45.49	0.00	0.00	59.2	0.216E+00	1.94	15.43	1.94	0.00
46.76	0.00	0.00	59.5	0.215E+00	1.94	15.55	1.94	0.00
48.02	0.00	0.00	59.8	0.214E+00	1.94	15.66	1.94	0.00
49.28	0.00	0.00	60.2	0.213E+00	1.94	15.77	1.94	0.00
50.54	0.00	0.00	60.5	0.212E+00	1.93	15.88	1.93	0.00
51.80	0.00	0.00	60.8	0.210E+00	1.93	15.99	1.93	0.00
53.06	0.00	0.00	61.2	0.209E+00	1.93	16.10	1.93	0.00
54.32	0.00	0.00	61.5	0.208E+00	1.93	16.21	1.93	0.00
55.59	0.00	0.00	61.9	0.207E+00	1.92	16.32	1.92	0.00
56.85	0.00	0.00	62.2	0.206E+00	1.92	16.43	1.92	0.00
58.11	0.00	0.00	62.6	0.205E+00	1.92	16.53	1.92	0.00
59.37	0.00	0.00	62.9	0.203E+00	1.92	16.64	1.92	0.00
60.63	0.00	0.00	63.3	0.202E+00	1.92	16.75	1.92	0.00
61.89	0.00	0.00	63.6	0.201E+00	1.92	16.85	1.92	0.00
63.15	0.00	0.00	64.0	0.200E+00	1.91	16.96	1.91	0.00
64.41	0.00	0.00	64.4	0.199E+00	1.91	17.07	1.91	0.00
65.68	0.00	0.00	64.7	0.198E+00	1.91	17.17	1.91	0.00
66.94	0.00	0.00	65.1	0.197E+00	1.91	17.28	1.91	0.00
68.20	0.00	0.00	65.5	0.195E+00	1.91	17.38	1.91	0.00
69.46	0.00	0.00	65.9	0.194E+00	1.91	17.48	1.91	0.00
70.72	0.00	0.00	66.2	0.193E+00	1.91	17.59	1.91	0.00
71.98	0.00	0.00	66.6	0.192E+00	1.91	17.69	1.91	0.00
73.24	0.00	0.00	67.0	0.191E+00	1.91	17.79	1.91	0.00
74.50	0.00	0.00	67.4	0.190E+00	1.91	17.90	1.91	0.00
75.77	0.00	0.00	67.8	0.189E+00	1.91	18.00	1.91	0.00
77.03	0.00	0.00	68.2	0.188E+00	1.91	18.10	1.91	0.00
78.29	0.00	0.00	68.6	0.187E+00	1.91	18.20	1.91	0.00
79.55	0.00	0.00	69.0	0.186E+00	1.91	18.30	1.91	0.00
80.81	0.00	0.00	69.4	0.184E+00	1.91	18.40	1.91	0.00
82.07	0.00	0.00	69.8	0.183E+00	1.91	18.50	1.91	0.00
83.33	0.00	0.00	70.2	0.182E+00	1.91	18.60	1.91	0.00
84.60	0.00	0.00	70.6	0.181E+00	1.92	18.70	1.92	0.00
85.86	0.00	0.00	71.0	0.180E+00	1.92	18.80	1.92	0.00
87.12	0.00	0.00	71.5	0.179E+00	1.92	18.90	1.92	0.00
88.38	0.00	0.00	71.9	0.178E+00	1.92	19.00	1.92	0.00
89.64	0.00	0.00	72.3	0.177E+00	1.92	19.10	1.92	0.00
90.90	0.00	0.00	72.7	0.176E+00	1.92	19.20	1.92	0.00
92.16	0.00	0.00	73.2	0.175E+00	1.92	19.30	1.92	0.00
93.42	0.00	0.00	73.6	0.174E+00	1.93	19.39	1.93	0.00
94.69	0.00	0.00	74.1	0.173E+00	1.93	19.49	1.93	0.00
95.95	0.00	0.00	74.5	0.172E+00	1.93	19.59	1.93	0.00
97.21	0.00	0.00	74.9	0.171E+00	1.93	19.69	1.93	0.00
98.47	0.00	0.00	75.4	0.170E+00	1.93	19.78	1.93	0.00
99.73	0.00	0.00	75.8	0.169E+00	1.94	19.88	1.94	0.00
100.99	0.00	0.00	76.3	0.168E+00	1.94	19.97	1.94	0.00
102.25	0.00	0.00	76.8	0.167E+00	1.94	20.07	1.94	0.00
103.51	0.00	0.00	77.2	0.166E+00	1.94	20.17	1.94	0.00
104.78	0.00	0.00	77.7	0.165E+00	1.95	20.26	1.95	0.00
106.04	0.00	0.00	78.2	0.164E+00	1.95	20.35	1.95	0.00

CORMIX2 PREDICTION FILE: Thermal Discharge

XX								
107.30	0.00	0.00	78.6	0.163E+00	1.95	20.45	1.95	0.00
108.56	0.00	0.00	79.1	0.162E+00	1.95	20.54	1.95	0.00
109.82	0.00	0.00	79.6	0.161E+00	1.96	20.64	1.96	0.00
111.08	0.00	0.00	80.1	0.160E+00	1.96	20.73	1.96	0.00
112.34	0.00	0.00	80.6	0.159E+00	1.96	20.83	1.96	0.00
113.61	0.00	0.00	81.1	0.158E+00	1.97	20.92	1.97	0.00
114.87	0.00	0.00	81.6	0.157E+00	1.97	21.01	1.97	0.00
116.13	0.00	0.00	82.1	0.156E+00	1.97	21.10	1.97	0.00
117.39	0.00	0.00	82.6	0.155E+00	1.98	21.20	1.98	0.00
118.65	0.00	0.00	83.1	0.154E+00	1.98	21.29	1.98	0.00
119.91	0.00	0.00	83.6	0.153E+00	1.98	21.38	1.98	0.00
121.17	0.00	0.00	84.1	0.152E+00	1.99	21.47	1.99	0.00
122.43	0.00	0.00	84.6	0.151E+00	1.99	21.56	1.99	0.00
123.70	0.00	0.00	85.1	0.150E+00	1.99	21.66	1.99	0.00
124.96	0.00	0.00	85.6	0.149E+00	2.00	21.75	2.00	0.00
126.22	0.00	0.00	86.2	0.149E+00	2.00	21.84	2.00	0.00
127.48	0.00	0.00	86.7	0.148E+00	2.01	21.93	2.01	0.00
128.74	0.00	0.00	87.2	0.147E+00	2.01	22.02	2.01	0.00
130.00	0.00	0.00	87.8	0.146E+00	2.01	22.11	2.01	0.00
131.26	0.00	0.00	88.3	0.145E+00	2.02	22.20	2.02	0.00
132.52	0.00	0.00	88.9	0.144E+00	2.02	22.29	2.02	0.00
133.79	0.00	0.00	89.4	0.143E+00	2.03	22.38	2.03	0.00
135.05	0.00	0.00	90.0	0.142E+00	2.03	22.47	2.03	0.00
136.31	0.00	0.00	90.5	0.141E+00	2.04	22.56	2.04	0.00
137.57	0.00	0.00	91.1	0.141E+00	2.04	22.65	2.04	0.00

Cumulative travel time = 700.9561 sec

END OF MOD241: BUOYANT AMBIENT SPREADING

 Due to the attachment or proximity of the plume to the bottom, the bottom coordinate for the FAR-FIELD differs from the ambient depth, ZFB = 0 m.
 In a subsequent analysis set "depth at discharge" equal to "ambient depth".

BEGIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

Vertical diffusivity (initial value) = 0.658E-02 m²/s
 Horizontal diffusivity (initial value) = 0.822E-02 m²/s

Profile definitions:

BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
 = or equal to layer depth, if fully mixed
 BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
 measured horizontally in Y-direction
 ZU = upper plume boundary (Z-coordinate)
 ZL = lower plume boundary (Z-coordinate)
 S = hydrodynamic centerline dilution
 C = centerline concentration (includes reaction effects, if any)

Plume Stage 1 (not bank attached):

X	Y	Z	S	C	BV	BH	ZU	ZL
137.57	0.00	0.00	91.1	0.141E+00	2.04	22.65	2.04	0.00

**** REGULATORY MIXING ZONE BOUNDARY ****

In this prediction interval the plume DOWNSTREAM distance meets or exceeds the regulatory value = 187.00 m.
 This is the extent of the REGULATORY MIXING ZONE.
 Plume interacts with SURFACE.

CORMIX2 PREDICTION FILE: Thermal Discharge

XX

The passive diffusion plume becomes VERTICALLY FULLY MIXED within this prediction interval.

192.19	0.00	0.00	95.8	0.134E+00	2.13	22.81	2.13	0.00
246.82	0.00	0.00	96.4	0.133E+00	2.13	22.97	2.13	0.00
301.44	0.00	0.00	97.1	0.132E+00	2.13	23.12	2.13	0.00
356.07	0.00	0.00	97.8	0.131E+00	2.13	23.28	2.13	0.00
410.69	0.00	0.00	98.4	0.130E+00	2.13	23.44	2.13	0.00
465.32	0.00	0.00	99.1	0.129E+00	2.13	23.59	2.13	0.00
519.94	0.00	0.00	99.7	0.128E+00	2.13	23.74	2.13	0.00
574.56	0.00	0.00	100.3	0.128E+00	2.13	23.90	2.13	0.00
629.19	0.00	0.00	101.0	0.127E+00	2.13	24.05	2.13	0.00
683.81	0.00	0.00	101.6	0.126E+00	2.13	24.20	2.13	0.00
738.44	0.00	0.00	102.2	0.125E+00	2.13	24.35	2.13	0.00
793.06	0.00	0.00	102.9	0.124E+00	2.13	24.50	2.13	0.00
847.69	0.00	0.00	103.5	0.124E+00	2.13	24.64	2.13	0.00
902.31	0.00	0.00	104.1	0.123E+00	2.13	24.79	2.13	0.00
956.93	0.00	0.00	104.7	0.122E+00	2.13	24.94	2.13	0.00
1011.56	0.00	0.00	105.3	0.122E+00	2.13	25.08	2.13	0.00
1066.18	0.00	0.00	105.9	0.121E+00	2.13	25.23	2.13	0.00
1120.81	0.00	0.00	106.5	0.120E+00	2.13	25.37	2.13	0.00
1175.43	0.00	0.00	107.1	0.119E+00	2.13	25.51	2.13	0.00
1230.06	0.00	0.00	107.7	0.119E+00	2.13	25.65	2.13	0.00
1284.68	0.00	0.00	108.3	0.118E+00	2.13	25.79	2.13	0.00
1339.30	0.00	0.00	108.9	0.118E+00	2.13	25.93	2.13	0.00
1393.93	0.00	0.00	109.5	0.117E+00	2.13	26.07	2.13	0.00
1448.55	0.00	0.00	110.1	0.116E+00	2.13	26.21	2.13	0.00
1503.18	0.00	0.00	110.6	0.116E+00	2.13	26.35	2.13	0.00
1557.80	0.00	0.00	111.2	0.115E+00	2.13	26.49	2.13	0.00
1612.43	0.00	0.00	111.8	0.114E+00	2.13	26.63	2.13	0.00
1667.05	0.00	0.00	112.4	0.114E+00	2.13	26.76	2.13	0.00
1721.67	0.00	0.00	112.9	0.113E+00	2.13	26.90	2.13	0.00
1776.30	0.00	0.00	113.5	0.113E+00	2.13	27.03	2.13	0.00
1830.92	0.00	0.00	114.1	0.112E+00	2.13	27.17	2.13	0.00
1885.55	0.00	0.00	114.6	0.112E+00	2.13	27.30	2.13	0.00
1940.17	0.00	0.00	115.2	0.111E+00	2.13	27.43	2.13	0.00
1994.80	0.00	0.00	115.7	0.111E+00	2.13	27.56	2.13	0.00
2049.42	0.00	0.00	116.3	0.110E+00	2.13	27.69	2.13	0.00
2104.04	0.00	0.00	116.8	0.110E+00	2.13	27.83	2.13	0.00
2158.67	0.00	0.00	117.4	0.109E+00	2.13	27.96	2.13	0.00
2213.29	0.00	0.00	117.9	0.109E+00	2.13	28.08	2.13	0.00
2267.92	0.00	0.00	118.5	0.108E+00	2.13	28.21	2.13	0.00
2322.54	0.00	0.00	119.0	0.108E+00	2.13	28.34	2.13	0.00
2377.17	0.00	0.00	119.5	0.107E+00	2.13	28.47	2.13	0.00
2431.79	0.00	0.00	120.1	0.107E+00	2.13	28.60	2.13	0.00
2486.41	0.00	0.00	120.6	0.106E+00	2.13	28.72	2.13	0.00
2541.04	0.00	0.00	121.1	0.106E+00	2.13	28.85	2.13	0.00
2595.66	0.00	0.00	121.7	0.105E+00	2.13	28.98	2.13	0.00
2650.29	0.00	0.00	122.2	0.105E+00	2.13	29.10	2.13	0.00
2704.91	0.00	0.00	122.7	0.104E+00	2.13	29.22	2.13	0.00
2759.54	0.00	0.00	123.2	0.104E+00	2.13	29.35	2.13	0.00
2814.16	0.00	0.00	123.8	0.103E+00	2.13	29.47	2.13	0.00
2868.78	0.00	0.00	124.3	0.103E+00	2.13	29.59	2.13	0.00
2923.41	0.00	0.00	124.8	0.103E+00	2.13	29.72	2.13	0.00
2978.03	0.00	0.00	125.3	0.102E+00	2.13	29.84	2.13	0.00
3032.66	0.00	0.00	125.8	0.102E+00	2.13	29.96	2.13	0.00
3087.28	0.00	0.00	126.3	0.101E+00	2.13	30.08	2.13	0.00

CORMIX2 PREDICTION FILE: Thermal Discharge

XX								
3141.91	0.00	0.00	126.8	0.101E+00	2.13	30.20	2.13	0.00
3196.53	0.00	0.00	127.3	0.101E+00	2.13	30.32	2.13	0.00
3251.15	0.00	0.00	127.8	0.100E+00	2.13	30.44	2.13	0.00
3305.78	0.00	0.00	128.3	0.998E-01	2.13	30.56	2.13	0.00
3360.40	0.00	0.00	128.8	0.994E-01	2.13	30.68	2.13	0.00
3415.03	0.00	0.00	129.3	0.990E-01	2.13	30.80	2.13	0.00
3469.65	0.00	0.00	129.8	0.986E-01	2.13	30.91	2.13	0.00
3524.28	0.00	0.00	130.3	0.982E-01	2.13	31.03	2.13	0.00
3578.90	0.00	0.00	130.8	0.979E-01	2.13	31.15	2.13	0.00
3633.52	0.00	0.00	131.3	0.975E-01	2.13	31.26	2.13	0.00
3688.15	0.00	0.00	131.8	0.971E-01	2.13	31.38	2.13	0.00
3742.77	0.00	0.00	132.2	0.968E-01	2.13	31.50	2.13	0.00
3797.40	0.00	0.00	132.7	0.964E-01	2.13	31.61	2.13	0.00
3852.02	0.00	0.00	133.2	0.961E-01	2.13	31.73	2.13	0.00
3906.65	0.00	0.00	133.7	0.957E-01	2.13	31.84	2.13	0.00
3961.27	0.00	0.00	134.2	0.954E-01	2.13	31.95	2.13	0.00
4015.89	0.00	0.00	134.6	0.951E-01	2.13	32.07	2.13	0.00
4070.52	0.00	0.00	135.1	0.947E-01	2.13	32.18	2.13	0.00
4125.14	0.00	0.00	135.6	0.944E-01	2.13	32.29	2.13	0.00
4179.77	0.00	0.00	136.1	0.941E-01	2.13	32.40	2.13	0.00
4234.39	0.00	0.00	136.5	0.937E-01	2.13	32.52	2.13	0.00
4289.02	0.00	0.00	137.0	0.934E-01	2.13	32.63	2.13	0.00
4343.64	0.00	0.00	137.5	0.931E-01	2.13	32.74	2.13	0.00
4398.26	0.00	0.00	137.9	0.928E-01	2.13	32.85	2.13	0.00
4452.89	0.00	0.00	138.4	0.925E-01	2.13	32.96	2.13	0.00
4507.51	0.00	0.00	138.9	0.922E-01	2.13	33.07	2.13	0.00
4562.14	0.00	0.00	139.3	0.919E-01	2.13	33.18	2.13	0.00
4616.76	0.00	0.00	139.8	0.916E-01	2.13	33.29	2.13	0.00
4671.39	0.00	0.00	140.2	0.913E-01	2.13	33.40	2.13	0.00
4726.01	0.00	0.00	140.7	0.910E-01	2.13	33.51	2.13	0.00
4780.64	0.00	0.00	141.1	0.907E-01	2.13	33.61	2.13	0.00
4835.26	0.00	0.00	141.6	0.904E-01	2.13	33.72	2.13	0.00
4889.89	0.00	0.00	142.0	0.901E-01	2.13	33.83	2.13	0.00
4944.51	0.00	0.00	142.5	0.898E-01	2.13	33.94	2.13	0.00
4999.13	0.00	0.00	142.9	0.895E-01	2.13	34.04	2.13	0.00
5053.76	0.00	0.00	143.4	0.893E-01	2.13	34.15	2.13	0.00
5108.38	0.00	0.00	143.8	0.890E-01	2.13	34.26	2.13	0.00
5163.01	0.00	0.00	144.3	0.887E-01	2.13	34.36	2.13	0.00
5217.63	0.00	0.00	144.7	0.884E-01	2.13	34.47	2.13	0.00
5272.26	0.00	0.00	145.2	0.882E-01	2.13	34.57	2.13	0.00
5326.88	0.00	0.00	145.6	0.879E-01	2.13	34.68	2.13	0.00
5381.51	0.00	0.00	146.0	0.876E-01	2.13	34.78	2.13	0.00
5436.13	0.00	0.00	146.5	0.874E-01	2.13	34.89	2.13	0.00
5490.75	0.00	0.00	146.9	0.871E-01	2.13	34.99	2.13	0.00
5545.38	0.00	0.00	147.4	0.869E-01	2.13	35.09	2.13	0.00
5600.00	0.00	0.00	147.8	0.866E-01	2.13	35.20	2.13	0.00

Cumulative travel time = 28809.9336 sec

Simulation limit based on maximum specified distance = 5600.00 m.
 This is the REGION OF INTEREST limitation.

END OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

 Because of the fairly LARGE SPACING between adjacent risers/nozzles/ports,
 the above results may be UNRELIABLE in the immediate near-field of

XX

A SUBSEQUENT APPLICATION OF CORMIX1 IS RECOMMENDED to provide more detail for one of the individual jets/plumes in the initial region before merging.

[illegible]

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SITE NAME/LABEL:           North American Stainless
  DESIGN CASE:             Major Modification - Temperature Mixing Zone
    FILE NAME:             C:\Program Files\CORMIX 5.0 TEST\MyFiles\NAS Major
Mod Temperature.prd
  Using subsystem CORMIX2:  Multiport Diffuser Discharges
    Start of session:      01/27/2009--13:36:35

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AMBIENT PARAMETERS:

Cross-section	=	bounded
Width	BS	= 560 m
Channel regularity	ICHREG	= 1
Ambient flowrate	QA	= 300.16 m ³ /s
Average depth	HA	= 2.76 m
Depth at discharge	HD	= 2.13 m
Ambient velocity	UA	= 0.1942 m/s
Darcy-Weisbach friction factor	F	= 0.0504
Wind velocity	UW	= 2 m/s
Stratification Type	STRCND	= U
Surface temperature		= 25 degC
Bottom temperature		= 25 degC
Calculated FRESH-WATER DENSITY values:		
Surface density	RHOAS	= 997.0456 kg/m ³
Bottom density	RHOAB	= 997.0456 kg/m ³

Submerged Multiport Diffuser Discharge

Diffuser type	DITYPE = unidirectional perpendicular
Diffuser length	LD = 22.88 m
Nearest bank	= left
Diffuser endpoints	YB1 = 49.56 m; YB2 = 72.43 m
Number of openings	NOPEN = 3
Number of Risers	NRISER = 3
Ports/Nozzles per Riser	NPPERR = 1
Spacing between risers/openings	SPAC = 11.44 m
Port/Nozzle diameter	D0 = 0.25 m

CORMIX SESSION REPORT: Thermal Discharge

XX

with contraction ratio		= 1
Equivalent slot width	B0	= 0.0064 m
Total area of openings	TA0	= 0.1473 m ²
Discharge velocity	U0	= 1.34 m/s
Total discharge flowrate	Q0	= 0.197157 m ³ /s
Discharge port height	H0	= 0.1 m
Nozzle arrangement	BETYPE	= unidirectional without fanning
Diffuser alignment angle	GAMMA	= 90 deg
Vertical discharge angle	THETA	= 15 deg
Actual Vertical discharge angle	THEAC	= 15 deg
Horizontal discharge angle	SIGMA	= 0 deg
Relative orientation angle	BETA	= 90 deg
Discharge temperature (freshwater)		= 12.80 degC
Corresponding density	RHO0	= 999.4040 kg/m ³
Density difference	DRHO	= -2.3584 kg/m ³
Buoyant acceleration	GP0	= -0.0232 m/s ²
Discharge concentration	C0	= 12.800000 deg.C
Surface heat exchange coeff.	KS	= 0 m/s
Coefficient of decay	KD	= 0 /s

FLUX VARIABLES PER UNIT DIFFUSER LENGTH:

Discharge (volume flux)	q0	= 0.008617 m ² /s
Momentum flux	m0	= 0.011537 m ³ /s ²
Buoyancy flux	j0	= -0.000200 m ³ /s ³

DISCHARGE/ENVIRONMENT LENGTH SCALES:

LQ = 0.01 m	Lm = 0.31 m	LM = 3.37 m
lm' = 99999 m	Lb' = 99999 m	La = 99999 m

(These refer to the actual discharge/environment length scales.)

NON-DIMENSIONAL PARAMETERS:

Slot Froude number	FR0	= 109.57
Port/nozzle Froude number	FRD0	= 17.58
Velocity ratio	R	= 6.89

MIXING ZONE / TOXIC DILUTION ZONE / AREA OF INTEREST PARAMETERS:

Toxic discharge		= no
Water quality standard specified		= yes
Water quality standard	CSTD	= 6.7 deg.C
Regulatory mixing zone		= yes
Regulatory mixing zone specification		= distance
Regulatory mixing zone value		= 187 m (m ² if area)
Region of interest		= 5600 m

HYDRODYNAMIC CLASSIFICATION:

FLOW CLASS	= MNU7	
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This flow configuration applies to a layer corresponding to the full water depth at the discharge site.

Applicable layer depth = water depth = 2.13 m

MIXING ZONE EVALUATION (hydrodynamic and regulatory summary):

X-Y-Z Coordinate system:

CORMIX SESSION REPORT: Thermal Discharge

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Origin is located at the bottom below the port center:
61.00 m from the left bank/shore.
Number of display steps NSTEP = 100 per module.

NEAR-FIELD REGION (NFR) CONDITIONS :

Note: The NFR is the zone of strong initial mixing. It has no regulatory implication. However, this information may be useful for the discharge designer because the mixing in the NFR is usually sensitive to the discharge design conditions.

Pollutant concentration at NFR edge c = 0.2503 deg.C
Dilution at edge of NFR s = 51.1
NFR Location: x = 11.44 m
 y = 0 m
 z = 0 m

NFR plume dimensions: half-width (bh) = 10.76 m
 thickness (bv) = 2.13 m

Cumulative travel time: 51.9086 sec.

Buoyancy assessment:

The effluent density is greater than the surrounding ambient water density at the discharge level.
Therefore, the effluent is **NEGATIVELY BUOYANT** and will tend to sink towards the bottom.

IMPORTANT NOTE:

Since the effluent is **NEGATIVELY BUOYANT**, it is **STRONGLY** recommended that you consider using the Brine or Sediment options for Effluent specification for a more detailed analysis.

CORMIX will however continue with the current simulation.

Near-field instability behavior:

The diffuser flow will experience instabilities with full vertical mixing in the near-field.
There may be benthic impact of high pollutant concentrations.

FAR-FIELD MIXING SUMMARY:

Plume is vertically fully mixed **WITHIN NEAR-FIELD** (or a fraction thereof), but **RE-STRATIFIES LATER**.
Plume becomes vertically fully mixed again at 192.19 m downstream.

PLUME BANK CONTACT SUMMARY:

Plume in bounded section does not contact bank.

***** TOXIC DILUTION ZONE SUMMARY *****
No TDZ was specified for this simulation.

***** REGULATORY MIXING ZONE SUMMARY *****
The plume conditions at the boundary of the specified RMZ are as follows:

Pollutant concentration c = 0.134312 deg.C
Corresponding dilution s = 95.3
Plume location: x = 187 m
 y = 0 m
 z = 0 m

Plume dimensions: half-width (bh) = 22.79 m
 thickness (bv) = 2.12 m

Cumulative travel time: 955.3182 sec.

At this position, the plume is **NOT IN CONTACT** with any bank.
Furthermore, the specified water quality standard has indeed been met

CORMIX SESSION REPORT: Thermal Discharge

XX

within the RMZ. In particular:
The ambient water quality standard was encountered at the following
plume position:
Water quality standard = 6.7 deg.C
Corresponding dilution s = 1.9
Plume location: x = 0.07 m
(centerline coordinates) y = 0 m
z = 0.11 m
Plume dimensions: half-width (bh) = 11.43 m
thickness (bv) = 0.02 m

***** FINAL DESIGN ADVICE AND COMMENTS *****

CORMIX2 uses the TWO-DIMENSIONAL SLOT DIFFUSER CONCEPT to represent the actual three-dimensional diffuser geometry. Thus, it approximates the details of the merging process of the individual jets from each port/nozzle.

In the present design, the spacing between adjacent ports/nozzles (or riser assemblies) is somewhat greater (in the range between three times to ten times) the local water depth. It is unlikely that sufficient lateral interaction of adjacent jets will occur in the near-field. However, the individual jets/plumes may merge soon after in the intermediate-field or in the far-field.

CORMIX2 may have LIMITED APPLICABILITY for this discharge situation. The results may be somewhat unrealistic in the near-field (minimum dilution may be overpredicted), but appear to be applicable for the intermediate- and far-field processes.
The user is advised to use a subsequent CORMIX1 (single port discharge) analysis, using discharge data for an individual diffuser jet/plume, in order to compare to the present near-field prediction.

REMINDER: The user must take note that HYDRODYNAMIC MODELING by any known technique is NOT AN EXACT SCIENCE.

Extensive comparison with field and laboratory data has shown that the CORMIX predictions on dilutions and concentrations (with associated plume geometries) are reliable for the majority of cases and are accurate to within about +/-50% (standard deviation).

As a further safeguard, CORMIX will not give predictions whenever it judges the design configuration as highly complex and uncertain for prediction.

KPDES



KENTUCKY POLLUTANT DISCHARGE ELIMINATION SYSTEM

PERMIT

PERMIT NO.: KY0095877

AI NO.: 711

AUTHORIZATION TO DISCHARGE UNDER THE KENTUCKY POLLUTANT DISCHARGE ELIMINATION SYSTEM

Pursuant to Authority in KRS 224,

North American Stainless
6870 Highway 42 East
Ghent, Kentucky 41045

is authorized to discharge from a facility located at

North American Stainless
6870 Highway 42 East
Ghent, Carroll County, Kentucky

to receiving waters named

Outfalls 001 and 007 discharges to the Ohio River at mile point 442.25 (USCOE mile point 539).

Outfalls 005 and 006 are in-stream monitoring locations on McCool's Creek at approximate mile points 3.1 and 1.95 respectively.

Outfall 009 discharges to Outfall 001.

in accordance with effluent limitations, monitoring requirements, and other conditions set forth in PARTS I, II, III, IV, and V hereof. The permit consists of this cover sheet, and PART I 12 pages, PART II 1 page, PART III 3 pages, PART IV 9 pages, and PART V 3 pages.

This permit became effective on November 1, 2006.

This modified permit shall become effective on

This permit and the authorization to discharge shall expire at midnight, October 31, 2011.

Date Signed

Sandra L. Gruzesky, Director
Division of Water

A1. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on the effective date of this permit and lasting through the term of this permit, the permittee is authorized to discharge from Outfall serial number: 001 - Main Plant Discharge (Treated wastewaters include: Process wastewaters and cooling tower blowdown from the Continuous Casting, Hot Strip Mill, and Long Products Hot Rolling, and process wastewaters from the Long Products Surface Finishing, and Cold Mill Finishing. Untreated wastewaters include: Blowdown from AOD/EAF cooling tower, Melt Shop water treatment plant, Z-Mill cooling tower, and Compressor cooling tower, and Groundwater and Storm water runoff from various plant locations.) Such discharges shall be limited and monitored by the permittee as specified below:

<u>EFFLUENT CHARACTERISTICS</u>	<u>DISCHARGE LIMITATIONS</u>				<u>MONITORING REQUIREMENTS</u>	
	(lbs/day)		Other Units (Specify)		Measurement	Sample
	Monthly	Daily	Monthly	Daily	Frequency	Type
	<u>Avg.</u>	<u>Max.</u>	<u>Avg.</u>	<u>Max.</u>		
Flow (MGD)	Report	Report	N/A	N/A	Continuous	Recorder
Total Suspended Solids (lbs/day)						
Tier 1 (No AP4)	617	1503	N/A	N/A	1/Week	24-Hr. Composite
Tier 2 (AP4 @ 75%)	731	1768	N/A	N/A	1/Week	24-Hr. Composite
Tier 3 (AP4 @ 100%)	769	1856	N/A	N/A	1/Week	24-Hr. Composite
Oil & Grease (lbs/day)						
Tier 1 (No AP4)	96	396	N/A	N/A	1/Week	Grab
Tier 2 (AP4 @ 75%)	134	510	N/A	N/A	1/Week	Grab
Tier 3 (AP4 @ 100%)	146	548	N/A	N/A	1/Week	Grab
Total Chromium (lbs/day)						
Tier 1 (No AP4)	6.1	15.2	N/A	N/A	1/Week	24-Hr. Composite
Tier 2 (AP4 @ 75%)	7.7	19	N/A	N/A	1/Week	24-Hr. Composite
Tier 3 (AP4 @ 100%)	8.2	20.3	N/A	N/A	1/Week	24-Hr. Composite
Total Nickel (lbs/day)						
Tier 1 (No AP4)	6.4	16.7	N/A	N/A	1/Week	24-Hr. Composite
Tier 2 (AP4 @ 75%)	7.5	20.1	N/A	N/A	1/Week	24-Hr. Composite
Tier 3 (AP4 @ 100%)	7.9	21.3	N/A	N/A	1/Week	24-Hr. Composite
Tier 1 (No AP4)	- Limits are for current operations without Acid Pickling Line 4 and Acid Roaster.					
Tier 2 (AP4 @ 75%)	- Limits are for current operations plus the addition of Acid Pickling Line 4 at 75% capacity and Acid Roaster.					
Tier 3 (AP4 @ 100%)	- Limits are for current operations plus the addition of Acid Pickling Line 4 at 100% capacity and Acid Roaster.					

The abbreviation N/A means Not Applicable.

A1. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS - CONTINUED

During the period beginning on the effective date of this permit and lasting through the term of this permit, the permittee is authorized to discharge from Outfall serial number: 001 - Main Plant Discharge (Treated wastewaters include: Process wastewaters and cooling tower blowdown from the Continuous Casting, Hot Strip Mill, and Long Products Hot Rolling, and process wastewaters from the Long Products Surface Finishing, and Cold Mill Finishing. Untreated wastewaters include: Blowdown from AOD/EDF cooling tower, Melt Shop water treatment plant, Z-Mill cooling tower, and Compressor cooling tower, and Groundwater and Storm water runoff from various plant locations.)

Such discharges shall be limited and monitored by the permittee as specified below:

<u>EFFLUENT CHARACTERISTICS</u>	<u>DISCHARGE LIMITATIONS</u>				<u>MONITORING REQUIREMENTS</u>	
	(lbs/day)		Other Units (Specify)		Measurement <u>Frequency</u>	Sample <u>Type</u>
	Monthly <u>Avg.</u>	Daily <u>Max.</u>	Monthly <u>Avg.</u>	Daily <u>Max.</u>		
Naphthalene (lbs/day)	N/A	0.044	N/A	N/A	1/Year	Grab
Tetrachloroethylene (lbs/day)	N/A	0.066	N/A	N/A	1/Year	Grab
Temperature (°F)	N/A	N/A	95	100	1/Week	Grab
Ammonia (as mg/l N)	N/A	N/A	Report	Report	1/Week	24-Hr. Composite
Hardness (as mg/l CaCO ₃)	N/A	N/A	Report	Report	1/Week	Grab
Priority Pollutants (mg/l)	N/A	N/A	Report	Report	1/Quarter	Grab
Specific Conductance (µmho/cm)	N/A	N/A	Report	Report	1/Week	Grab
Total Recoverable Chromium (mg/l)	N/A	N/A	Report	Report	1/Week	24-Hr. Composite
Hexavalent Chromium (mg/l)	N/A	N/A	Report	Report	1/Week	24-Hr. Composite
Total Recoverable Lead (mg/l)	N/A	N/A	Report	Report	1/Week	24-Hr. Composite
Total Recoverable Nickel (mg/l)	N/A	N/A	Report	Report	1/Week	24-Hr. Composite
Total Recoverable Zinc (mg/l)	N/A	N/A	Report	Report	1/Week	24-Hr. Composite

The abbreviation N/A means Not Applicable.

Priority Pollutants shall be monitored quarterly by grab sample. The results of the analyses shall be totaled and reported as a single concentration on the DMR. The individual results for each of the priority pollutants shall be recorded and summarized on a spreadsheet and shall be submitted with the next KPDES permit renewal application. The term Priority Pollutants means those pollutants listed Part III D., page III-2.

Tier 2 and Tier 3 limits will become effective upon the receipt and acknowledgment by the Division of Water of written notification from North American Stainless that the conditions for that Tier has been met and maintained.

A1. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS - CONTINUED

During the period beginning on the effective date of this permit and lasting through the term of this permit, the permittee is authorized to discharge from Outfall serial number: 001 - Main Plant Discharge (Treated wastewaters include: Process wastewaters and cooling tower blowdown from the Continuous Casting, Hot Strip Mill, and Long Products Hot Rolling, and process wastewaters from the Long Products Surface Finishing, and Cold Mill Finishing. Untreated wastewaters include: Blowdown from AOD/EAF cooling tower, Melt Shop water treatment plant, Z-Mill cooling tower, and Compressor cooling tower, and Groundwater and Storm water runoff from various plant locations.)

Such discharges shall be limited and monitored by the permittee as specified below:

<u>EFFLUENT CHARACTERISTICS</u>	<u>DISCHARGE LIMITATIONS</u>				<u>MONITORING REQUIREMENTS</u>	
	(lbs/day)		Other Units (Specify)		Measurement <u>Frequency</u>	Sample <u>Type</u>
	Monthly <u>Avg.</u>	Daily <u>Max.</u>	Monthly <u>Avg.</u>	Daily <u>Max.</u>		
Acute Toxicity (TU _a)						
Flow ≤2.9 MGD	N/A	N/A	N/A	<20.00	1/Month	Grab
2.9 MGD < Flow ≤3.76 MGD	N/A	N/A	N/A	<18.03	1/Month	Grab
3.76 MGD < Flow ≤4.5 MGD	N/A	N/A	N/A	<15.33	1/Month	Grab
Flow ≤2.9 MGD	- When flow of Outfall 001 is 2.9 MGD or less then a toxicity limit of 20 TU _a shall apply.					
2.9 MGD < Flow ≤3.76 MGD	- When the flow of is greater than 2.9 MGD but less than or equal to 3.76 MGD then a toxicity limit of 18.03 TU _a shall apply.					
3.76 MGD < Flow ≤4.5 MGD	- When the flow of is greater than 3.76 MGD but less than or equal to 4.5 MGD then a toxicity limit of 15.33 TU _a shall apply.					

The pH of the effluent shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be monitored 2/Week by grab sample.

Acute Toxicity Limits for those flows as specified above shall become effective when the Division of Water has determined that North American Stainless has maintained for a minimum of six months the specified flow and has provided written notification of such.

The abbreviation N/A means Not Applicable.

There shall be no discharge of floating solids or visible foam or sheen in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location: nearest accessible point prior to discharge to or mixing with the receiving waters or wastestreams from other outfalls.

A2. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on the effective date of this permit and lasting through the term of this permit, the permittee is authorized to discharge from Outfall serial number: 002 - Sanitary Wastewater (Internal Outfall).

Such discharges shall be limited and monitored by the permittee as specified below:

<u>EFFLUENT CHARACTERISTICS</u>	<u>DISCHARGE LIMITATIONS</u>				<u>MONITORING REQUIREMENTS</u>	
	(lbs/day)		Other Units (Specify)		Measurement	Sample
	Monthly	Daily	Monthly	Daily		
	<u>Avg.</u>	<u>Max.</u>	<u>Avg.</u>	<u>Max.</u>	<u>Frequency</u>	<u>Type</u>

Outfall has being eliminated. Sanitary wastewaters were connected to the City of Ghent's wastewater collection and treatment system April 6, 2006.

A3. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on the effective date of this permit and lasting through the term of this permit, the permittee is authorized to discharge from Outfall serial number: 003 - Cold Mill Operations (Internal Outfall).

Such discharges shall be limited and monitored by the permittee as specified below:

<u>EFFLUENT CHARACTERISTICS</u>	<u>DISCHARGE LIMITATIONS</u>				<u>MONITORING REQUIREMENTS</u>	
	(lbs/day)		Other Units (Specify)		Measurement	Sample
	Monthly	Daily	Monthly	Daily		
	<u>Avg.</u>	<u>Max.</u>	<u>Avg.</u>	<u>Max.</u>	<u>Frequency</u>	<u>Type</u>

Outfall has being eliminated. The facility has undergone a number expansions and reconfigurations since the last reissuance of the permit. The effluents from a number of wastewater treatment plants have been combined for discharge through a multi-port diffuser, Outfall 001. Since these wastewaters have similar characteristics and a common discharge point the compliance point has been moved to Outfall 001.

A4. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on the effective date of this permit and lasting through the term of this permit, the permittee is authorized to discharge from Outfall serial number: 004 - Hot Strip Mill (Roughing Mill, and Steckel Mill) Operations (Internal Outfall).

Such discharges shall be limited and monitored by the permittee as specified below:

<u>EFFLUENT CHARACTERISTICS</u>	<u>DISCHARGE LIMITATIONS</u>				<u>MONITORING REQUIREMENTS</u>	
	(lbs/day)		Other Units (Specify)		Measurement	Sample
	Monthly	Daily	Monthly	Daily		
	<u>Avg.</u>	<u>Max.</u>	<u>Avg.</u>	<u>Max.</u>	<u>Frequency</u>	<u>Type</u>

Outfall has being eliminated. The facility has undergone a number expansions and reconfigurations since the last reissuance of the permit. The effluents from a number of wastewater treatment plants have been combined for discharge through a multi-port diffuser, Outfall 001. Since these wastewaters have similar characteristics and a common discharge point the compliance point has been moved to Outfall 001.

A5. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS - CONTINUED

During the period beginning on the effective date of this permit and lasting through the term of this permit, the permittee is authorized to discharge from Outfall serial number: 005 - McCool's Creek - Upstream (Instream Monitoring Point)

Such discharges shall be limited and monitored by the permittee as specified below:

<u>EFFLUENT CHARACTERISTICS</u>	<u>DISCHARGE LIMITATIONS</u>				<u>MONITORING REQUIREMENTS</u>	
	(lbs/day)		Other Units (Specify)		Measurement <u>Frequency</u>	Sample <u>Type</u>
	Monthly <u>Avg.</u>	Daily <u>Max.</u>	Monthly <u>Avg.</u>	Daily <u>Max.</u>		
Flow (MGD)	Report	Report	N/A	N/A	1/Quarter	Instantaneously
Total Suspended Solids (mg/l)	Report	Report	N/A	N/A	1/Quarter	Grab
Oil & Grease (mg/l)	Report	Report	N/A	N/A	1/Quarter	Grab
Hardness (as mg/l CaCO ₃)	Report	Report	N/A	N/A	1/Quarter	Grab
pH (standard units)	Report	Report	N/A	N/A	1/Quarter	Grab
Total Recoverable Metals (mg/l)	Report	Report	N/A	N/A	1/Quarter	Grab

The term Total Recoverable Metals means Antimony, Arsenic, Beryllium, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Silver, Thallium, and Zinc. Total Recoverable Metals shall be monitored quarterly by grab sample. The results of the analyses shall be totaled and reported as a single concentration on the DMR. The laboratory bench sheets showing the results for each metal shall be attached to the DMR.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location: nearest accessible point on McCool's Creek upstream of the facility at approximately mile point 3.1.

A6. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS - CONTINUED

During the period beginning on the effective date of this permit and lasting through the term of this permit, the permittee is authorized to discharge from Outfall serial number: 006 - McCool's Creek - Downstream (Instream Monitoring Point)

Such discharges shall be limited and monitored by the permittee as specified below:

<u>EFFLUENT CHARACTERISTICS</u>	<u>DISCHARGE LIMITATIONS</u>				<u>MONITORING REQUIREMENTS</u>	
	(lbs/day)		Other Units (Specify)		Measurement <u>Frequency</u>	Sample <u>Type</u>
	Monthly <u>Avg.</u>	Daily <u>Max.</u>	Monthly <u>Avg.</u>	Daily <u>Max.</u>		
Flow (MGD)	Report	Report	N/A	N/A	1/Quarter	Instantaneously
Total Suspended Solids (mg/l)	Report	Report	N/A	N/A	1/Quarter	Grab
Oil & Grease (mg/l)	Report	Report	N/A	N/A	1/Quarter	Grab
Hardness (as mg/l CaCO ₃)	Report	Report	N/A	N/A	1/Quarter	Grab
pH (standard units)	Report	Report	N/A	N/A	1/Quarter	Grab
Total Recoverable Metals (mg/l)	Report	Report	N/A	N/A	1/Quarter	Grab

The term Total Recoverable Metals means Antimony, Arsenic, Beryllium, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Silver, Thallium, and Zinc. Total Recoverable Metals shall be monitored quarterly by grab sample. The results of the analyses shall be totaled and reported as a single concentration on the DMR. The laboratory bench sheets showing the results for each metal shall be attached to the DMR.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location: nearest accessible point on McCool's Creek downstream of the facility at approximately mile point 1.95.

A7. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS - CONTINUED

During the period beginning on the effective date of this permit and lasting through the term of this permit, the permittee is authorized to discharge from Outfall serial number: 007 - Groundwater and Plant Storm Water Runoff

Such discharges shall be limited and monitored by the permittee as specified below:

<u>EFFLUENT CHARACTERISTICS</u>	<u>DISCHARGE LIMITATIONS</u>				<u>MONITORING REQUIREMENTS</u>	
	(lbs/day)		Other Units (Specify)		Measurement	Sample
	Monthly	Daily	Monthly	Daily	Frequency	Type
	<u>Avg.</u>	<u>Max.</u>	<u>Avg.</u>	<u>Max.</u>		
Flow (MGD)	Report	Report	N/A	N/A	1/Quarter	Instantaneously
Total Suspended Solids (mg/l)	Report	Report	N/A	N/A	1/Quarter	Grab
Oil & Grease (mg/l)	Report	Report	N/A	N/A	1/Quarter	Grab
Hardness (as mg/l CaCO ₃)	Report	Report	N/A	N/A	1/Quarter	Grab
pH (standard units)	Report	Report	N/A	N/A	1/Quarter	Grab
Total Recoverable Metals (mg/l)	Report	Report	N/A	N/A	1/Quarter	Grab

The term Total Recoverable Metals means Antimony, Arsenic, Beryllium, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Selenium, Silver, Thallium, and Zinc. Total Recoverable Metals shall be monitored quarterly by grab sample. The results of the analyses shall be totaled and reported as a single concentration on the DMR. The laboratory bench sheets showing the results for each metal shall be attached to the DMR.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location: nearest accessible point prior to discharge to or mixing with the receiving waters or wastestreams from other outfalls.

A8. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on the effective date of this permit and lasting through the term of this permit, the permittee is authorized to discharge from Outfall serial number: 008 - Process wastewaters from the electric arc furnace, argon-oxygen decarburization, and continuous caster and non-contact cooling water (Internal Outfall to Outfall 007).

Such discharges shall be limited and monitored by the permittee as specified below:

<u>EFFLUENT CHARACTERISTICS</u>	<u>DISCHARGE LIMITATIONS</u>				<u>MONITORING REQUIREMENTS</u>	
	(lbs/day)		Other Units (Specify)		<u>Measurement</u> <u>Frequency</u>	<u>Sample</u> <u>Type</u>
	Monthly	Daily	Monthly	Daily		
	<u>Avg.</u>	<u>Max.</u>	<u>Avg.</u>	<u>Max.</u>		

Outfall has being eliminated. The facility has undergone a number expansions and reconfigurations since the last reissuance of the permit. The effluents from a number of wastewater treatment plants have been combined for discharge through a multi-port diffuser, Outfall 001. Since these wastewaters have similar characteristics and a common discharge point the compliance point has been moved to Outfall 001.

A9. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS - CONTINUED

During the period beginning on the effective date of this permit and lasting through the term of this permit, the permittee is authorized to discharge from Outfall serial number: 009 - Billet and Slab Casters (Internal Outfall)

Such discharges shall be limited and monitored by the permittee as specified below:

<u>EFFLUENT CHARACTERISTICS</u>	<u>DISCHARGE LIMITATIONS</u>				<u>MONITORING REQUIREMENTS</u>	
	(lbs/day)	Other Units (Specify)			<u>Measurement Frequency</u>	<u>Sample Type</u>
	Monthly <u>Avg.</u>	Daily <u>Max.</u>	Monthly <u>Avg.</u>	Daily <u>Max.</u>		
Flow (MGD)	Report	Report	N/A	N/A	Continuous	Recorder
Total Lead (lbs/day)	0.25	0.76	N/A	N/A	2/Week	24-Hr. Composite
Total Zinc (lbs/day)	0.38	1.14	N/A	N/A	2/Week	24-Hr. Composite

The abbreviation N/A means Not Applicable.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location: nearest accessible point prior to discharge to or mixing with the receiving waters or wastestreams from other outfalls.

B. Schedule of Compliance

The permittee shall achieve compliance with all requirements on the effective date of this permit or as specified by the permit.

The limits for Temperature on Outfall 001 shall become effective eighteen (18) months after the effective date of this permit.

PART II
Page II-1
Permit No.: KY0095877
AI NO.: 711

STANDARD CONDITIONS FOR KPDES PERMIT

The permittee is also advised that all KPDES permit conditions in KPDES Regulation 401 KAR 5:065, Section 1 will apply to all discharges authorized by this permit.

This permit has been issued under the provisions of KRS Chapter 224 and regulations promulgated pursuant thereto. Issuance of this permit does not relieve the permittee from the responsibility of obtaining any other permits or licenses required by this Cabinet and other state, federal, and local agencies.

It is the responsibility of the permittee to demonstrate compliance with permit parameter limitations by utilization of sufficiently sensitive analytical methods.

PART III

OTHER REQUIREMENTS

A. Reporting of Monitoring Results

Monitoring results obtained during each monitoring period must be reported on a preprinted Discharge Monitoring Report (DMR) Form that will be mailed to you. The completed DMR for each monitoring period must be sent to the Division of Water at the address listed below (with a copy to the appropriate Regional Office) postmarked no later than the 28th day of the month following the monitoring period for which monitoring results were obtained.

Division of Water
Florence Regional Office
8020 Veterans Memorial Drive
Suite 110
Florence, Kentucky 41042
ATTN: Supervisor

Energy & Environment Cabinet
Dept. for Environmental Protection
Division of Water/SWP Branch
200 Fair Oaks Lane
Frankfort, Kentucky 40601

B. Reopener Clause

This permit shall be modified, or alternatively revoked and reissued, to comply with any applicable effluent standard or limitation issued or approved under 401 KAR 5:050 through 5:086, if the effluent standard or limitation so issued or approved:

1. Contains different conditions or is otherwise more stringent than any effluent limitation in the permit; or
2. Controls any pollutant not limited in the permit.

The permit as modified or reissued under this paragraph shall also contain any other requirements of KRS Chapter 224 when applicable.

C. Cooling Water Additives, FIFRA, and Mollusk Control

The discharge of any product registered under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) in cooling water which ultimately may be released to the waters of the Commonwealth is prohibited, except Herbicides, unless specifically identified and authorized by the KPDES permit. In the event the permittee needs to use a biocide or chemical not previously reported for mollusk control or other purpose, the permittee shall submit sufficient information, a minimum of thirty (30) days prior to the commencement of use of said biocides or chemicals, to the Division of Water for review and establishment of appropriate control parameters. Such information requirements shall include:

1. Name and general composition of biocide or chemical,
2. Any and all aquatic organism toxicity data,
3. Quantities to be used,
4. Frequencies of use,
5. Proposed discharge concentrations, and
6. EPA registration number, if applicable.

D. Outfall Signage

The permittee shall post a permanent marker at all discharge locations and/or monitoring points. The marker shall be at least 2 feet by 2 feet in size and a minimum of 3 feet above ground level with the Permittee Name and KPDES permit and outfall numbers in 2 inch letters. For internal monitoring points the marker shall be of sufficient size to include the outfall number in 2 inch letters and shall be posted as near as possible to the actual sampling location.

D MIXING ZONE

The assigned mixing zone for this discharge shall have the following dimensions:

Linear Distance from Point of Discharge:	0.21 feet in any direction
Maximum Surface Area Involved:	0.032 square feet
Volume of Receiving Water	10,600 cfs (1,034 MGD)

E. Priority Pollutants

PRIORITY POLLUTANTS		
001 Acenaphthene	044 Methylene chloride (dichloromethane)	088 Vinyl chloride (chloroethylene)
002 Acrolein	045 Methyl chloride (dichloromethane)	089 Aldrin
003 Acrylonitrile	046 Methyl bromide (bromomethane)	090 Dieldrin
004 Benzene	047 Bromoform (tribromomethane)	091 Chlordane (technical mixture and metabolites)
005 Benzidine	048 Dichlorobromomethane	092 4,4-DDT
006 Carbon tetrachloride (tetrachloromethane)	051 Chlorodibromomethane	093 4,4-DDE (p,p-DDX)
007 Chlorobenzene	052 Hexachlorobutadiene	094 4,4-DDD (p,p-TDE)
008 1,2,4-trichlorobenzene	053 Hexachloromyclopentadiene	095 Alpha-endosulfan
009 Hexachlorobenzene	054 Isophorone	096 Beta-endosulfan
010 1,2-dichloroethane	055 Naphthalene	097 Endosulfan sulfate
011 1,1,1-trichloroethane	056 Nitrobenzene	098 Endrin
012 Hexachloroethane	057 2-nitrophenol	099 Endrin aldehyde
013 1,1-dichloroethane	058 4-nitrophenol	100 Heptachlor
014 1,1,2-trichloroethane	059 2,4-dinitrophenol	101 Heptachlor epoxide (BHC-hexachlorocyclohexane)
015 1,1,2,2-tetrachloroethane	060 4,6-dinitro-o-cresol	102 Alpha-BHC
016 Chloroethane	061 N-nitrosodimethylamine	103 Beta-BHC
018 Bis(2-chloroethyl) ether	062 N-nitrosodiphenylamine	104 Gamma-BHC (lindane)
019 2-chloroethyl vinyl ether (mixed)	063 N-nitrosodi-n-propylamin	105 Delta-BHC (PCB-polychlorinated biphenyls)
020 2-chloronaphthalene	064 Pentachlorophenol	106 PCB-1242 (Arochlor 1242)
021 2,4, 6-trichlorophenol	065 Phenol	107 PCB-1254 (Arochlor 1254)
022 Parachlorometa cresol	066 Bis(2-ethylhexyl) phthalate	108 PCB-1221 (Arochlor 1221)
023 Chloroform (trichloromethane)	067 Butyl benzyl phthalate	109 PCB-1232 (Arochlor 1232)
024 2-chlorophenol	068 Di-N-Butyl Phthalate	110 PCB-1248 (Arochlor 1248)
025 1,2-dichlorobenzene	069 Di-n-octyl phthalate	111 PCB-1260 (Arochlor 1260)
026 1,3-dichlorobenzene	070 Diethyl Phthalate	112 PCB-1016 (Arochlor 1016)
027 1,4-dichlorobenzene	071 Dimethyl phthalate	113 Toxaphene
028 3,3-dichlorobenzidine	072 1,2-benzanthracene (benzo(a)anthracene)	114 Antimony
029 1,1-dichloroethylene	073 Benzo(a)pyrene (3,4-benzo-pyrene)	115 Arsenic
030 1,2-trans-dichloroethylene	074 3,4-Benzofluoranthene (benzo(b)fluoranthene)	116 Asbestos
031 2,4-dichlorophenol	075 1,12-benzofluoranthene (benzo(b)fluoranthene)	117 Beryllium
032 1,2-dichloropropane	076 Chrysene	118 Cadmium
033 1,2-dichloropropylene (1,3-dichloropropene)	077 Acenaphthylene	119 Chromium
034 2,4-dimethylphenol	078 Anthracene	120 Copper
035 2,4-dinitrotoluene	079 1,12-benzoperylene (benzo(ghi) perylene)	121 Cyanide, Total
036 2,6-dinitrotoluene	080 Fluorene	122 Lead
037 1,2-diphenylhydrazine	081 Phenanthrene	123 Mercury
038 Ethylbenzene	082 1,2,5,6-dibenzanthracene (dibenzo(,h) anthracene)	124 Nickel
039 Fluoranthene	083 Indeno (,1,2,3-cd) pyrene (2,3-o-pheynylene pyrene)	125 Selenium
040 4-chlorophenyl phenyl ether	084 Pyrene	126 Silver
041 4-bromophenyl phenyl ether	085 Tetrachloroethylene	127 Thallium
042 Bis(2-chloroisopropyl) ether	086 Toluene	126 Silver
043 Bis(2-chloroethoxy) methane	087 Trichloroethylene	128 Zinc
		129 2,3,7,8-tetrachloro-dibenzo-p-dioxin (TCDD)

PART IV
ACUTE CONCERNS
Biomonitoring

In accordance with PART I of this permit, the permittee shall initiate, within 30 days of the effective date of this permit, or continue the series of tests described below to evaluate wastewater toxicity of the discharge from Outfall 001 (2.9 MGD Flow).

1. Test Requirements

- A. The permittee shall perform a 48-hour static toxicity test with Ceriodaphnia sp. and a 48-hour static toxicity test with fathead minnow (Pimephales promelas). Tests shall be conducted on each of two (2) grab samples taken over a 24-hour period (e.g. discrete sample 1 taken at 9:00 a.m., sample 2 taken at 9:00 p.m.). Tests shall be conducted with appropriate replicates of 5% effluent, a control and a minimum of four (4) evenly spaced effluent concentrations. If the permit limit is less than 100% effluent and greater than or equal to 75% effluent, then one (1) concentration should be 100%. If the permit limit is less than 75% effluent, the permit limit concentration shall be bracketed with two (2) concentrations above and two (2) concentrations below. The selection of the effluent concentrations is subject to revision by the Division. Testing of the effluent shall be initiated within 36 hours of each sample collection. Controls shall be conducted concurrently with effluent testing using a synthetic water. The analysis will be deemed reasonable and good only if control survival is 90% or greater in test organisms held in synthetic water. Any test that does not meet the control acceptability criteria shall be repeated as soon as practicable within the monitoring period (i.e. monthly or quarterly). Noncompliance with the toxicity limit will be demonstrated if the LC_{50} is less than 5% effluent.

- B. Tests shall be conducted on both species at the frequency specified in PART I of this permit.

If after at least six (6) tests it can be determined that Ceriodaphnia or the fathead minnow is more sensitive, a request for testing only that organism can be made to the Division. Upon approval, that organism can be chosen as representative and all subsequent tests can be conducted on only that organism.

2. Reporting Requirements

Results of all tests conducted with any organism shall be reported according to the most recent format provided by the Division of Water (Appendix 10 of 'Methods for Culturing and Conducting Toxicity Tests with Pimephales promelas and Ceriodaphnia dubia (Fifth Edition)' KDOW, January 2002). Test results shall be submitted to the Division of Water with the next regularly scheduled discharge monitoring report.

3. Acute Toxicity

If noncompliance with the toxicity limit occurs (the LC_{50} is less than 5% effluent), the permittee must conduct a second test using two (2) grabs within 10 days of the first failure. This test will be used in evaluating the persistence of the toxic event and the possible need for a toxics reduction evaluation (TRE).

3. Acute Toxicity (continuation)

If the second test demonstrates noncompliance with the toxicity limit, the permittee will be required to perform accelerated testing as specified in the following paragraphs.

Complete four (4) tests within 60 days of failure of the second test to evaluate the frequency and degree of toxicity. The results of the two (2) tests specified above and of the four (4) additional tests will be used for purposes of this evaluation.

If results from two (2) of any six (6) tests show a significant noncompliance with the acute limit (≥ 1.2 times the TU_a), or results from four (4) of any six (6) tests show acute toxicity (as defined in 1.A), a Toxicity Reduction Evaluation (TRE) will be required.

The permittee shall provide written notification, within five (5) days of the completion of accelerated testing to the Division of Water, that toxicity persisted and that a TRE would be initiated or that toxicity did not persist and the normal testing would resume.

Should toxicity not prove persistent during the accelerated testing, but reoccur within 12 months of the initial failure at a level ≥ 1.2 times the TU_a , then a TRE shall be initiated without further accelerated testing.

4. Toxicity Reduction Evaluation (TRE)

Having determined the effluent to be toxic, the permittee shall develop and implement an acceptable plan for the identification and treatability of the toxicant(s) within 90 days of completion of accelerated testing. The plan shall be developed in accordance with EPA guidance provided in the following EPA publications and submitted for DEP review and comment:

Clarifications Regarding Toxicity Reduction and Identification Evaluations in the National Pollutant Discharge Elimination System Program. March 27, 2001.

Toxicity Reduction Evaluation Guidance For Municipal Wastewater Treatment Plants. August, 1999.

Methods for Aquatic Toxicity Identification Evaluations: Phase I Toxicity Characterization Procedures. February 1991.

Methods for Aquatic Toxicity Identification Evaluations: Phase II Toxicity Identification Procedures. February 1989.

Methods for Aquatic Toxicity Identification Evaluations: Phase III Toxicity Confirmation Procedures. February 1989.

Generalized Methodology for Conducting Industrial Toxicity Reduction Evaluations (TREs). March 1989.

Abstracts of Toxicity Reduction Evaluations. March 1989.

The plan shall include Toxic Identification Evaluation (TIE) procedures, treatability studies, and evaluations of: chemical usage including changes in types, handling and suppliers; operational and process procedures; housekeeping and maintenance activities; and raw materials. The TRE will establish an implementation schedule not to exceed 24 months for completion of these activities. The implementation schedule shall include monthly progress reports and a final report.

Upon the completion of the TRE, the permittee shall submit a final report detailing the findings of the TRE and the actions to be taken to prevent the reoccurrence of toxicity. This final report shall include: the toxicant(s), if any are identified; treatment options; operational changes; and the proposed resolutions including an implementation schedule not to exceed 180 days.

Should the permittee determine the toxicant(s) and/or a workable treatment prior to the conclusion of the TRE, the permittee will notify, within five (5) days, the Division of Water and take appropriate actions to implement the solution within 180 days of determination.

5. Test Methods

All test organisms, procedures, and quality assurance criteria used shall be in accordance with Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, EPA-821-R-02-012 (5th edition) or the most recently published edition of this publication.

PART IV
ACUTE CONCERNS
Biomonitoring

In accordance with PART I of this permit, the permittee shall initiate, within 30 days of the effective date of notification by the Division of Water that a sustained discharge flow between, 2.9 MGD < Flow \leq 3.76 MGD is being maintained the series of tests described below to evaluate wastewater toxicity of the discharge from Outfall 001.

1. Test Requirements

- A. The permittee shall perform a 48-hour static toxicity test with Ceriodaphnia sp. and a 48-hour static toxicity test with fathead minnow (Pimephales promelas). Tests shall be conducted on each of two (2) grab samples taken over a 24-hour period (e.g. discrete sample 1 taken at 9:00 a.m., sample 2 taken at 9:00 p.m.). Tests shall be conducted with appropriate replicates of 5.55% effluent, a control and a minimum of four (4) evenly spaced effluent concentrations. If the permit limit is less than 100% effluent and greater than or equal to 75% effluent, then one (1) concentration should be 100%. If the permit limit is less than 75% effluent, the permit limit concentration shall be bracketed with two (2) concentrations above and two (2) concentrations below. The selection of the effluent concentrations is subject to revision by the Division. Testing of the effluent shall be initiated within 36 hours of each sample collection. Controls shall be conducted concurrently with effluent testing using a synthetic water. The analysis will be deemed reasonable and good only if control survival is 90% or greater in test organisms held in synthetic water. Any test that does not meet the control acceptability criteria shall be repeated as soon as practicable within the monitoring period (i.e. monthly or quarterly). Noncompliance with the toxicity limit will be demonstrated if the LC_{50} is less than 5.55% effluent.
- B. Tests shall be conducted on both species at the frequency specified in PART I of this permit.

If after at least six (6) tests it can be determined that Ceriodaphnia or the fathead minnow is more sensitive, a request for testing only that organism can be made to the Division. Upon approval, that organism can be chosen as representative and all subsequent tests can be conducted on only that organism.

2. Reporting Requirements

Results of all tests conducted with any organism shall be reported according to the most recent format provided by the Division of Water (Appendix 10 of 'Methods for Culturing and Conducting Toxicity Tests with Pimephales promelas and Ceriodaphnia dubia (Fifth Edition)' KDOW, January 2002). Test results shall be submitted to the Division of Water with the next regularly scheduled discharge monitoring report.

3. Acute Toxicity

If noncompliance with the toxicity limit occurs (the LC_{50} is less than 5.55% effluent), the permittee must conduct a second test using two (2) grabs within 10 days of the first failure. This test will be used in evaluating the persistence of the toxic event and the possible need for a toxics reduction evaluation (TRE).

3. Acute Toxicity (continuation)

If the second test demonstrates noncompliance with the toxicity limit, the permittee will be required to perform accelerated testing as specified in the following paragraphs.

Complete four (4) tests within 60 days of failure of the second test to evaluate the frequency and degree of toxicity. The results of the two (2) tests specified above and of the four (4) additional tests will be used for purposes of this evaluation.

If results from two (2) of any six (6) tests show a significant noncompliance with the acute limit (≥ 1.2 times the TU_a), or results from four (4) of any six (6) tests show acute toxicity (as defined in 1.A), a Toxicity Reduction Evaluation (TRE) will be required.

The permittee shall provide written notification, within five (5) days of the completion of accelerated testing to the Division of Water, that toxicity persisted and that a TRE would be initiated or that toxicity did not persist and the normal testing would resume.

Should toxicity not prove persistent during the accelerated testing, but reoccur within 12 months of the initial failure at a level ≥ 1.2 times the TU_a , then a TRE shall be initiated without further accelerated testing.

4. Toxicity Reduction Evaluation (TRE)

Having determined the effluent to be toxic, the permittee shall develop and implement an acceptable plan for the identification and treatability of the toxicant(s) within 90 days of completion of accelerated testing. The plan shall be developed in accordance with EPA guidance provided in the following EPA publications and submitted for DEP review and comment:

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Generalized Methodology for Conducting Industrial Toxicity Reduction Evaluations (TREs). March 1989.

Abstracts of Toxicity Reduction Evaluations. March 1989.

The plan shall include Toxic Identification Evaluation (TIE) procedures, treatability studies, and evaluations of: chemical usage including changes in types, handling and suppliers; operational and process procedures; housekeeping and maintenance activities; and raw materials. The TRE will establish an implementation schedule not to exceed 24 months for completion of these activities. The implementation schedule shall include monthly progress reports and a final report.

Upon the completion of the TRE, the permittee shall submit a final report detailing the findings of the TRE and the actions to be taken to prevent the reoccurrence of toxicity. This final report shall include: the toxicant(s), if any are identified; treatment options; operational changes; and the proposed resolutions including an implementation schedule not to exceed 180 days.

Should the permittee determine the toxicant(s) and/or a workable treatment prior to the conclusion of the TRE, the permittee will notify, within five (5) days, the Division of Water and take appropriate actions to implement the solution within 180 days of determination.

5. Test Methods

All test organisms, procedures, and quality assurance criteria used shall be in accordance with Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, EPA-821-R-02-012 (5th edition) or the most recently published edition of this publication.

**PART IV
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1. Test Requirements

- A. The permittee shall perform a 48-hour static toxicity test with Ceriodaphnia sp. and a 48-hour static toxicity test with fathead minnow (Pimephales promelas). Tests shall be conducted on each of two (2) grab samples taken over a 24-hour period (e.g. discrete sample 1 taken at 9:00 a.m., sample 2 taken at 9:00 p.m.). Tests shall be conducted with appropriate replicates of 6.52% effluent, a control and a minimum of four (4) evenly spaced effluent concentrations. If the permit limit is less than 100% effluent and greater than or equal to 75% effluent, then one (1) concentration should be 100%. If the permit limit is less than 75% effluent, the permit limit concentration shall be bracketed with two (2) concentrations above and two (2) concentrations below. The selection of the effluent concentrations is subject to revision by the Division. Testing of the effluent shall be initiated within 36 hours of each sample collection. Controls shall be conducted concurrently with effluent testing using a synthetic water. The analysis will be deemed reasonable and good only if control survival is 90% or greater in test organisms held in synthetic water. Any test that does not meet the control acceptability criteria shall be repeated as soon as practicable within the monitoring period (i.e. monthly or quarterly). Noncompliance with the toxicity limit will be demonstrated if the LC₅₀ is less than 6.52% effluent.
- B. Tests shall be conducted on both species at the frequency specified in PART I of this permit.

If after at least six (6) tests it can be determined that Ceriodaphnia or the fathead minnow is more sensitive, a request for testing only that organism can be made to the Division. Upon approval, that organism can be chosen as representative and all subsequent tests can be conducted on only that organism.

2. Reporting Requirements

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3. Acute Toxicity

If noncompliance with the toxicity limit occurs (the LC₅₀ is less than 6.52% effluent), the permittee must conduct a second test using two (2) grabs within 10 days of the first failure. This test will be used in evaluating the persistence of the toxic event and the possible need for a toxics reduction evaluation (TRE).

3. Acute Toxicity (continuation)

If the second test demonstrates noncompliance with the toxicity limit, the permittee will be required to perform accelerated testing as specified in the following paragraphs.

Complete four (4) tests within 60 days of failure of the second test to evaluate the frequency and degree of toxicity. The results of the two (2) tests specified above and of the four (4) additional tests will be used for purposes of this evaluation.

If results from two (2) of any six (6) tests show a significant noncompliance with the acute limit (≥ 1.2 times the TU_a), or results from four (4) of any six (6) tests show acute toxicity (as defined in 1.A), a Toxicity Reduction Evaluation (TRE) will be required.

The permittee shall provide written notification, within five (5) days of the completion of accelerated testing to the Division of Water, that toxicity persisted and that a TRE would be initiated or that toxicity did not persist and the normal testing would resume.

Should toxicity not prove persistent during the accelerated testing, but reoccur within 12 months of the initial failure at a level ≥ 1.2 times the TU_a , then a TRE shall be initiated without further accelerated testing.

4. Toxicity Reduction Evaluation (TRE)

Having determined the effluent to be toxic, the permittee shall develop and implement an acceptable plan for the identification and treatability of the toxicant(s) within 90 days of completion of accelerated testing. The plan shall be developed in accordance with EPA guidance provided in the following EPA publications and submitted for DEP review and comment:

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The plan shall include Toxic Identification Evaluation (TIE) procedures, treatability studies, and evaluations of: chemical usage including changes in types, handling and suppliers; operational and process procedures; housekeeping and maintenance activities; and raw materials. The TRE will establish an implementation schedule not to exceed 24 months for completion of these activities. The implementation schedule shall include monthly progress reports and a final report.

Upon the completion of the TRE, the permittee shall submit a final report detailing the findings of the TRE and the actions to be taken to prevent the reoccurrence of toxicity. This final report shall include: the toxicant(s), if any are identified; treatment options; operational changes; and the proposed resolutions including an implementation schedule not to exceed 180 days.

Should the permittee determine the toxicant(s) and/or a workable treatment prior to the conclusion of the TRE, the permittee will notify, within five (5) days, the Division of Water and take appropriate actions to implement the solution within 180 days of determination.

5. Test Methods

All test organisms, procedures, and quality assurance criteria used shall be in accordance with Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, EPA-821-R-02-012 (5th edition) or the most recently published edition of this publication.

PART V

BEST MANAGEMENT PRACTICES

SECTION A. GENERAL CONDITIONS

1. Applicability

These conditions apply to all permittees who use, manufacture, store, handle, or discharge any pollutant listed as: (1) toxic under Section 307(a)(1) of the Clean Water Act; (2) oil, as defined in Section 311(a)(1) of the Act; (3) any pollutant listed as hazardous under Section 311 of the Act; or (4) is defined as a pollutant pursuant to KRS 224.01-010(35) and who have ancillary manufacturing operations which could result in (1) the release of a hazardous substance, pollutant, or contaminant, or (2) an environmental emergency, as defined in KRS 224.01-400, as amended, or any regulation promulgated pursuant thereto (hereinafter, the "BMP pollutants"). These operations include material storage areas; plant site runoff; in-plant transfer, process and material handling areas; loading and unloading operations, and sludge and waste disposal areas.

2. BMP Plan

The permittee shall develop and implement a Best Management Practices (BMP) plan consistent with 401 KAR 5:065, Section 2(10) pursuant to KRS 224.70-110, which prevents or minimizes the potential for the release of "BMP pollutants" from ancillary activities through plant site runoff; spillage or leaks, sludge or waste disposal; or drainage from raw material storage. A Best Management Practices (BMP) plan will be prepared by the permittee unless the permittee can demonstrate through the submission of a BMP outline that the elements and intent of the BMP have been fulfilled through the use of existing plans such as the Spill Prevention Control and Countermeasure (SPCC) plans, contingency plans, and other applicable documents.

3. Implementation

If this is the first time for the BMP requirement, then the plan shall be developed and submitted to the Division of Water within 90 days of the effective date of the permit. Implementation shall be within 180 days of that submission. For permit renewals the plan in effect at the time of permit reissuance shall remain in effect. Modifications to the plan as a result of ineffectiveness or plan changes to the facility shall be submitted to the Division of Water and implemented as soon as possible.

4. General Requirements

The BMP plan shall:

- a. Be documented in narrative form, and shall include any necessary plot plans, drawings, or maps.
- b. Establish specific objectives for the control of toxic and hazardous pollutants.
 - (1) Each facility component or system shall be examined for its potential for causing a release of "BMP pollutants" due to equipment failure, improper operation, natural phenomena such as rain or snowfall, etc.

(2) Where experience indicates a reasonable potential for equipment failure (e.g., a tank overflow or leakage), natural condition (e.g., precipitation), or other circumstances which could result in a release of "BMP pollutants," the plan should include a prediction of the direction, rate of flow, and total quantity of the pollutants which could be released from the facility as result of each condition or circumstance.

- c. Establish specific Best Management Practices to meet the objectives identified under paragraph b of this section, addressing each component or system capable of causing a release of "BMP pollutants."
- d. Include any special conditions established in part b of this section.
- e. Be reviewed by plant engineering staff and the plant manager.

5. Specific Requirements

The plan shall be consistent with the general guidance contained in the publication entitled "NPDES Best Management Practices Guidance Document," and shall include the following baseline BMPs as a minimum.

- a. BMP Committee
- b. Reporting of BMP Incidents
- c. Risk Identification and Assessment
- d. Employee Training
- e. Inspections and Records
- f. Preventive Maintenance
- g. Good Housekeeping
- h. Materials Compatibility
- i. Security
- j. Materials Inventory

6. SPCC Plans

The BMP plan may reflect requirements for Spill Prevention Control and Countermeasure (SPCC) plans under Section 311 of the Act and 40 CFR Part 151, and may incorporate any part of such plans into the BMP plan by reference.

7. Hazardous Waste Management

The permittee shall assure the proper management of solid and hazardous waste in accordance with the regulations promulgated under the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1978 (RCRA) (40 U.S.C. 6901 et seq.) Management practices required under RCRA regulations shall be referenced in the BMP plan.

8. Documentation

The permittee shall maintain a description of the BMP plan at the facility and shall make the plan available upon request to NREPC personnel. Initial copies and modifications thereof shall be sent to the following addresses when required by Section 3:

Division of Water
Florence Regional Office
8020 Veterans Memorial Drive
Suite 110
Florence, Kentucky 41042
ATTN: Supervisor

Energy & Environment Cabinet
Dept. for Environmental Protection
Division of Water/SWP Branch
200 Fair Oaks Lane
Frankfort, Kentucky 40601

9. BMP Plan Modification

The permittee shall amend the BMP plan whenever there is a change in the facility or change in the operation of the facility which materially increases the potential for the ancillary activities to result in the release of "BMP pollutants."

10. Modification for Ineffectiveness

If the BMP plan proves to be ineffective in achieving the general objective of preventing the release of "BMP pollutants," then the specific objectives and requirements under paragraphs b and c of Section 4, the permit, and/or the BMP plan shall be subject to modification to incorporate revised BMP requirements. If at any time following the issuance of this permit the BMP plan is found to be inadequate pursuant to a state or federal site inspection or plan review, the plan shall be modified to incorporate such changes necessary to resolve the concerns.

SECTION B. SPECIFIC CONDITIONS

Periodically Discharged Wastewaters Not Specifically Covered By Effluent Conditions

The permittee shall include in this BMP plan procedures and controls necessary for the handling of periodically discharged wastewaters such as intake screen backwash, meter calibration, fire protection, hydrostatic testing water, water associated with demolition projects, etc.